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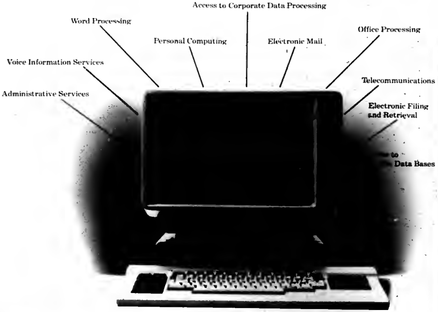

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COVER PHOTO BY GEOFF O'CONNELL AND CHUCK LADOUCEUR

Matt's office has been winning a lot of new business lately. And it's really not much of a secret.

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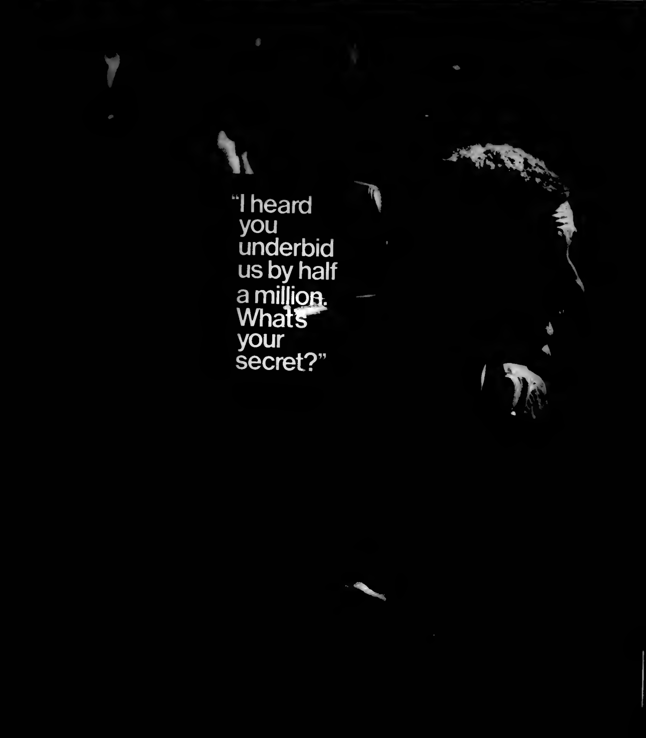
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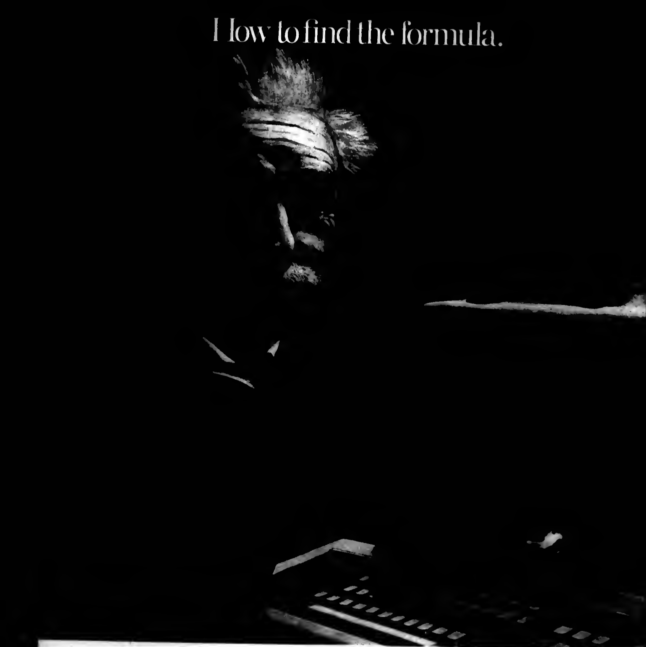
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Editorial

Where's the Glitz?

The ballyhoo of office automation has died. The glitz and the glamor never materialized. Instead, what has surfaced through the rubble of broken dreams and empty promises is some very down-to-earth functionality for office workers. Nothing too exciting, nothing that has revolutionized the working world, yet. The big bang theory of technology has never related to OA, which is as much an education and training process as a technological phenomenon.

But right in the middle of this steady evolutionary growth, the industry hit a slump, slowing the overall process. The microcomputer, the focal point of OA in most installations, is experiencing a momentary bottoming out after its dramatic rise.

In addition to the other evidence — vendors going out of business or drops in sales — a recent study by International Data Corp. of Framingham, Mass., has revealed that, for the second year in a row, the overall rate of DP/MIS spending has slowed. From the halcyon days of 15% annual growth, the rate dropped to an overall growth of 13% for 1983-84. And this year's study now shows only a 10.9% overall growth. Many industries would kill for that kind of growth rate, of course, but it's not what this industry have come to expect.

MIS itself may have to accept some of the responsibility for the current state of affairs. In the excitement over the microcomputer, in this age of instant gratification, MIS managers have in many instances been too eager to push technology into their companies. Some MIS managers have, in their desire to keep current and implement all the exciting new technologies being introduced, caused their companies to buy equipment they did not need and to abandon equipment that might have handled the job. Or, as was the case in the initial stages of the microcomputer, end users did the buying before MIS was able to get a handle on it. Too many micros now sit on desks and gather dust for executives not to feel burned or at least more cautious about investing in new technologies.

More and better business planning is the key. We have to look at how we can incorporate technology into the business strategy of the company, instead of buying technology in a vacuum. If MIS can convince top management that the technology will in fact help their bottom line and make them more competitive, the purse strings could open up again.

Office automation has frustrated many of its early proponents in its evolutionary approach. Nevertheless, through commitment, realistic expectations and ability to integrate the technologies and functions only if they match the business need, OA can eventually produce some pretty big changes in how we work.

Insider

"The Standard Mongers"

By Timothy J. Caffrey

The call for wide-ranging technical standards comes from all quarters of our industry. A quick perusal of the current trade press indicates that graphics and communication network arenas are the latest target of the standard mongers. Those who note the absence of standards claim that standards add legitimacy to new technologies and markets, make acquisition and installation of computer systems more cost-effective and diminish the decision-making burdens of those involved in selection and acquisition of computer systems. Despite the rhetoric, considerable effort and some progress, our evolution is littered with more failures than successes. A look at some drives for standardization helps to illustrate the nature of the beast.

In recent history, the success of IBM's Intel Corp./Microsoft Corp.-based Personal Computer architecture gave way to claims that a de facto market standard had emerged. Relieved personal computer purchasers in hundreds of large organizations authored planning documents that proclaimed 8088 and MS-DOS as the standard from which microcomputer purchasers could not deviate. While IBM (and quickly Compaq Computer Corp.) may have been pleased, few other market participants had much to cheer about. Other vendors were locked out of lucrative sales because they had designed faster or more flexible personal computers that did not meet the IBM standard head-on. Users continue to suffer the pains of distinguishing hardware compatibles from software compatibles from those that will run Lotus Development Corp.'s 1-2-3, but not Flight Simulator. As the IBM PC family expanded and new versions of MS-DOS emerged, users abandoned strident calls for compliance and ran to catch up. The de facto conclusion is that de facto market standards are anything but.

More recently, AT&T has claimed the Unix System V operating system as an industry standard. What IBM accomplished through brute force, AT&T attempted through full page adds in *The Wall Street Journal*. A standard Unix with the promise of architecture independence and protected investments attracted the attention of a large and often strident group of users, vendors and industry observers. In 1984, 1985 was proclaimed as the year when the Unix standard would gain a substantial following. In 1985, some are saying the same about 1986. All bets are off for 1987. Potential software developers and users grew skeptical as persistent hybrids like Digital Equipment Corp.'s Ultrix, Bell Laboratories' System III, IBM/Interactive Systems' PC IX and Microsoft Corp.'s Xenix cluttered and competed in the marketplace. AT&T's plans for a successor to System V do little to allay suspicion that another industry standard has come and gone.

Significant efforts to develop technical standards have come from other than marketing geniuses. Organizations like Institute of Electric & Electronics Engineers (IEEE) and International Standards Organization (ISO) have moved center stage in the standards drama.

Accumulated evidence begs the question of whether or not conscious pursuit of standards is a viable objective in the computer industry. When you dig behind the rhetoric, three significant hurdles become apparent. The first is that vendors are not too thrilled with the perceived demand for standards. Most vendor strategies call for meeting subsets of standard guidelines while reserving major portions of their architectures for proprietary solutions. A standardized market, after all, means ease of substitution, plug-compatibility and the potential of an unpleasant price war.

Another hurdle is that technology continues to change at a tremendous rate. However worn this proclamation: there is no arguing that technological progress is the single most important contributor to industry growth. In such an environment, the quest for standardization can easily be construed as a threat to innovation and a portent of stagnation.

A third more subtle hurdle is an apparent case of user schizophrenia. In particular, the quest for stability of standard technology conflicts with the fear of being left behind with old systems and stagnant job descriptions.

Thus, while vendors and users pay lip service and the ISO plods toward promulgation, effective standards in most segments of the computer industry remain elusive. Perhaps that's OK. Standards are signs of an equilibrium found in well-established, often staid industries. We still have a few good years left.

≡

Caffrey is director, strategies for microcomputers and office systems, for International Date Corp. in Framingham, Mass.

dB
BY RICH TENNANT
VENDORS, VENDORS, VENDORS. I DON'T KNOW HOW YOU KEEP UP WITH THE TECHNOLOGY, dB. INTEGRATING OUR OFFICE SYSTEM ISN'T GOING TO BE EASY.
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Computerworld Focus

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Q&A

Amy Wohl, president of Amy Wohl Associates of Bala Cynwyd, Pa., has been active in the office automation field for many years. When Wohl is a featured speaker at a conference, she plays to a standing-room-only crowd. She spoke to* Computerworld Focus *on the current status of OA and where it is headed.

Aren't most Fortune 500 or 1000 companies already automated?

No. In many cases when they say OA, they mean they have word processing systems. If you're talking about significant penetration of OA, there is no company in which the majority of departments already has OA.

So they really have a long way to go.

Yes, but that's not surprising. We began installing this stuff for real in 1982, so it's very early in terms of technology.

Some managers are worried that people on the other side of the bell-shaped user's curve will resist using OA tools.

I hope that means they're worried that it will be harder to compete as companies and the resisters will find it harder to compete for employment as more and more OA skills are demanded. I think they mean that people who were easiest to convince have now been convinced. The early adaptors have, in many cases, done their early adapting. But what happens, after a while, is you feel left out if you haven't learned a technology; then there is pressure on the technology-givers. The people who have been left behind feel bad about it and say, 'When am I getting mine?'

According to the September 16, 1985 issue of* Computerworld, *data processing spending is still down. Is this going to affect the ability of companies to provide the equipment and support?

I suspect there are two reasons DP spending is down. The first is large manufacturing companies have cut back slightly on capital spending. The second reason is that in many companies people are sitting on money that has been appropriated. One reason might be they're afraid to spend the money; they think something bad is going to happen and they ought to save it up. Another reason is that they're not yet ready to spend it. The selection and discussion cycle is very long. Either of those reasons will show up as lessened purchases. But if you're talking about money being there but not being spent, suddenly a lot of that money is going to come out and there is going to be a big bulge of purchases. We have seen lots of customers who have money to spend, but aren't ready to spend it.

In the meantime, are the users getting impatient?

Some are and some aren't. That varies from company to company and within companies. You'll have departments where everybody is ready and they're impatient. And you'll have other departments where nobody wants to hear about it.

Within companies, are there some departments with money to spend and others with none?

Absolutely. I have found the department that gets the most equipment is accounting and after that, research and development. R&D typically gets anything it wants in computer hardware unless the company is temporarily mad at R&D. I think marketing in most companies tends to be fairly unsophisticated about the use of computers and tends not to demand a lot of computing.

Typically, the marketing person got into marketing partly because of lack of interest in using technology or bean counting of any kind. That's antimarketing, remember? So their interest in computers, until we get them computers that don't require them to have those skills, is probably fairly minimal.

Will this push for OA happen quickly?

The politics of getting a big decision approved and the amount of coordination it takes within the user community in terms of getting people ready to make a decision are fairly significant. So however much time they allow and whatever they told the vendor, it is usually longer than that.

Vendors are usually disappointed because they need to sell stuff now. They're always pushing and unhappy, and you can't ever satisfy them. We have to understand that and say, 'OK, we know that it is going to take, on average, a year to a year and a half to go from deciding we want some OA to being ready to buy something.' To get from that point to deciding what you want to do as a company is going to take significantly longer.

So you're talking about a strategic plan.

Yes. Once the plans are in place, even then it takes time to figure out what you're going to do. And a lot of people tend to wait for all that to happen before deciding anything.

— Lee White

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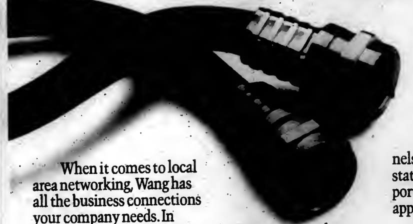

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Manager's Corner

Jim Young

Is data processing ready for the major leagues? Are DP executives ready to take their places beside corporate leaders and guide the destiny of their companies?

A measure of this may be how we handle the challenge of office automation. It is a fertile area that offers some important paybacks, but if DP sees this area as just another system, we may have already lost the battle. There are some important differences that make this area a special challenge. As such, it can highlight our adaptability and user orientation or be a showcase for a failure.

Unlike other DP projects, OA offers a broader area to address. To some companies, it may mean clustered word processing with electronic mail. In other companies, it may mostly be voice-over data communication. It may or may not include integrated copying, presentation graphics, in-house printing and in rare, sophisticated exceptions, specialized functions like teleconferencing, electronic document management, records management and so on. It all depends on what is suitable for each company. The challenge to DP is to select an OA solution that is in keeping with the business goals and opportunities of the company.

Once the areas of leverage are identified, an additional concern is getting the company to admit there is, indeed, a problem. In many cases, nothing seems to be broken. DP's challenge is to focus on the opportunities for cost savings, performance improvement and revenue generation that are available by implementing selected programs, while at the same time, avoid the many entrapping political pitfalls.

After evaluation of several alternatives, DP will want to suggest a solution to the problem areas identified. Be careful this is not just a vendor choice or a technical answer to business situations. The proper solution usually involves more than just hardware. Management processes to install and to manage OA might be needed. In some cases, staffing changes within the organization or within DP are necessary. This will allow the necessary infusion of specialized skills like WP, telecommunications or records management. But shun the temptation to build a DP empire. Advise the company, but don't try to control it.

As you might expect, these solutions have political overtones because we're changing the way people fundamentally work. As such, collaborative efforts to analyze problems and pick solutions are necessary, but it is a skillful DP manager who maintains progress despite the broad involvement. The DP manager can reinforce the image of being a reasonable but clever manager of a support function and not a rigid hidebound technician.

The most treacherous time for the OA project is when all plans begin becoming reality. One key to success is finding out just who the users are. This may be most of the work force spread over all functional areas and in all corners of the company. Getting in touch and getting their support is very ticklish. It is for this reason that a process, dedicated attention and specialized training management are necessary. Make sure you're getting some feedback to ensure the changes proceed smoothly.

The ultimate success of the OA project may be in DP's blooming relationship with top management. Despite interviewing, analyzing, implementing and working at the grass-roots level, the OA project will have to originate with top management. It can only succeed companywide with their blessings. Have they been convinced of the benefits of OA? Do they actively support DP's sponsorship? Do they even trust DP?

If you have shown management that you understand their concerns and are targeting bottom-line benefits from such programs, then you may well receive some active backing. But you may privately be on trial. Management may attempt to see if you use their patronage wisely.

If you can show that DP can make thoughtful changes smoothly and if you can deliver results, top management may then be persuaded that DP can effectively carry out companywide programs and be trusted with corporate leadership.

OA has unique facets and is notably different in some ways from traditional DP projects. The opportunities for a company are great, but the implications for the role of DP are even greater. If DP can adjust to this new challenge, it will show that it is a department that belongs in the major functional ranks of the company and can help formulate the strategic direction of the company.

On the other hand, DP could resort to canned solutions and cookie-cutter methods. It could try to pound the round peg in a square hole and find it has caused a problem, not fixed one. That failure will be highly visible and the consequences far-reaching.

For years DP has complained like Rodney Dangerfield, that we get no respect. A strong show of capable leadership backed by our results-oriented approach should put this complaint to rest. OA is the ideal project to demonstrate this potential

≡

Young is management information systems director and responsible for user technology at Wright Line, Inc., Worcester, Mass. He has worked in the industry for 15 years.

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Federal Micro Buying in '84 Up by 400%

The federal government's purchase of small computers increased during the fiscal year of 1984 to 37,277 units. This was more than a 400% increase over the 8,000 units purchased during the fiscal year of 1983.

These figures are taken from a report entitled *FY '84 Microcomputer Procurement Survey*, undertaken by the Office of Information Resources Management (Oirm), part of the General Services Administration (GSA), located in Washington, D.C.

The second annual survey from Oirm dealt with information provided by federal agencies on the make, model, vendor, quantity and total purchase price of those computers acquired between October 1, 1983 and September 30, 1984, and those computers costing less than $10,000 per unit.

The federal agencies reported that expenditures for these desktop computers increased from $34 million in 1983 to $137 million in 1984. The largest buyer was the Department of Defense, purchasing over 17,000 in 1984. IBM was the largest supplier, with over 10,000 units purchased from the company by the government.

"The survey indicates a rapid adoption of this new technology to achieve greater efficiency in the workplace," Grafton Biglow, GSA marketing specialist, explained. "The results may even be understated considering the difficulty in identifying all such equipment in light of the trend toward micro decentralization and management."

Further information is available from the Federal Equipment Data Center, General Services Administration — KHEE, Room 2008, 18th & F Sts., N.W., Washington, D.C. 20405.

Small Firms Accelerate Micro Buying

By 1988, 58% of small businesses in California will be using computers in their work, according to *The Pacific Bell Survey: California Small Businesses and Information Age Issues*, a 1985 survey conducted by San Francisco research firm Elrick and Lavidge, Inc. for Pacific Bell, also of San Francisco.

To arrive at the above figure, 35% of the respondents said they currently use

A Workout A Day Keeps Doctor Away

It may seem reminiscent of the exercise programs with which Chinese workers begin each day, but the operations center of American Express Co., Inc. in Phoenix, Ariz., is pure capitalistic Americana. Nevertheless, for five minutes twice each day, volunteers accompanied by music, lead data entry clerks and telephone operators in desk-side exercises that are said to release the stress and tension caused by constant work at computer terminals.

Tone Up at the Terminals was developed two years ago by Verbatim Corp., after the company sponsored a survey designed to determine office workers' views regarding technology in the workplace. The sample of 1,263 secretaries, word processing operators and administrative assistants showed that a substantial number of respondents had health concerns about the WP and data processing equipment they used, especially regarding eyestrain and back strain. The exercises, designed and demonstrated by exercise physiologist Denise Austin and endorsed by the American College of Sports Medicine, resulted in the distribution of more than 500,000 brochures. (*Tone Up at the Terminals* has now been expanded and is available as a four-component unit: a new 30-exercise booklet, a bimonthly newsletter about fitness and health, personal appearances by Austin and a video tape of the fitness program.)

While those polled by *Computerworld Focus* thought stress was relieved by *Tone Up at the Terminals*, they thought the booklet itself was a stress reliever. Liz Braczyk, WP operator at Wright Line, Inc. in Worcester, Mass., liked the pectoral stretch. "It sure has increased the number of word processing customers," she said. Sue Warren, also a WP operator at Wright Line, said her boss approved of the exercises, "as long as my fingers keep moving on the keyboard."

However, the last laugh may be Austin's. American Express conducted a follow-up study three months after the exercise program was instituted to measure the affects of the program. The study found operators averaged 5.5% more keystrokes per day and morale had improved.

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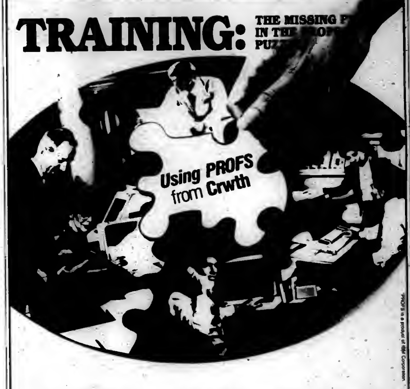

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In the News

computers in their businesses, and an additional 23% plan to purchase computers within the next three years.

Following the computer, the researchers found that audio three-way conferencing is the most widely-adopted technology among small businesses in California, with nearly 16% currently using the technology and expected to climb to 23% by 1988.

The report also noted that although a high percentage of small businesses have or plan to buy computers, only 11% said they currently used a modem, while another 11% indicated they expected to add a modem within the next three years. And voice mail, used by a very small percentage of small California businesses, is slated to rise slowly during the next three years.

Another finding noted in the report was that computerization in California's small businesses has happened only very recently, with 62% of those currently owning a computer having acquired the equipment within the last two years, while another 37% reported that modems and/or data transmission were added less than a year ago.

Almost 42% said that computers are used mostly in sales and marketing departments

Further information about the report is available from Pacific Bell, Room 1221, 140 New Montgomery St., San Francisco 94105.

Clerical Jobs On Decline 9 to 5 Reports

A report released by 9 to 5, The National Association of Working Women, entitled *Hidden Victims: Clerical Work, Automation and the Changing Economy* said clerical jobs are beginning to decline in the midwest and stagnate in the rest of the country. Since 1980, the national growth rate for clerical jobs has slowed to 2% less than the growth rate for all employment. And in the largest group of clerical workers (secretaries, stenographers and typists), the number of jobs has declined by 100,000.

This data contradicts assumptions made by policy makers, employers and economic analysts, Karen Nussbaum, executive director of 9 to 5, said. "The loss of clerical jobs is largely hidden from public view, coming mostly through attrition and internal reorganization rather than layoffs. [But] the end result is the same. There will be fewer clerical jobs to fill," Nussbaum said.

Although it was not clear that automation was the definitive factor in the clerical job market decline, the report described the way office work has changed with automation.

According to questionnaires filled out by clerical workers across the country, automation has its pros (increased skills, responsibility and productivity) and cons (decreased job opportunities, wages and autonomy).

Letters

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Dennis J. McNamara
Mechanical Engineer

Hershey Chocolate Co.
Hershey, Pa.

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I'm sure your readers will find it informative and interesting.

Christian Rottmann
Market Manager

AMP
Harrisburg, Pa.

Packet Switching Insight

I recently read your article titled, "Packet Switching: What's Down the Line?" in *Computerworld Focus*. I would like to correct some obvious miscommunication and provide some insight to new technology from Uninet.

First, Uninet is not a part of United Computing Systems. UCS has not existed for 3½ years. Uninet, Inc. is the data communications company of US Telecom, a United Telecom company.

Second, Uninet, in conjunction with M/A-COM has developed Gen 4, the first operationally intelligent network that utilizes fourth-generation technology. This technology is the answer to many private network and public network concerns.

V. Stan Harris
Manager, Marketing Communications

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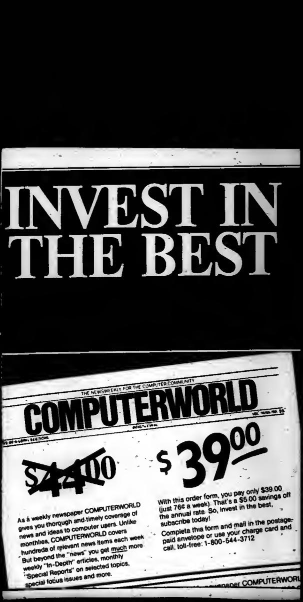

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- 20 Finance/Insurance/Real Estate
- 30 Medicine/Law/Education
- 40 Wholesale/Retail Trade
- 50 Business Service (except DP)
- 60 Government—State/Federal/Local
- 65 Public Utility/Communication Systems/Transportation
- 70 Mining/Construction/Petroleum/Refining
- 75 Other User________

Vendors
- 80 Manufacturer of Computers, Computer-related Systems or Peripherals
- 85 Computer Service Bureau/Software/Planning/Consulting
- 90 Computer/Peripheral Dealer/Distributor/Retailer
- 95 Other Vendor________

2. **OCCUPATION/FUNCTION (Circle One)**
- 11 President/Owner/Partner/General Manager
- 12 VP/Assistant VP
- 13 Treasurer/Controller/Financial Officer
- 21 Director/Manager/Supervisor DP/MIS Services
- 22 Director/Manager of Operations/Planning/Administrative Services
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor Programming
- 32 Programmer/Methods Analyst
- 35 OA/WP Director/Manager/Supervisor
- 38 Data Comm Network/Systems Mgmt
- 41 Engr/Scientific/R&D/Tech Mgmt
- 51 Mfg Sales Reps/Sales/Marketing Mgmt
- 60 Consulting Mgmt
- 70 Medical/Legal/Accounting Mgmt
- 80 Educator/Journalist/Librarian/Student
- 90 Other________

3. **COMPUTER INVOLVEMENT (Circle all that apply)**
Types of equipment with which you are personally involved either as user, vendor or consultant
- A. Mainframes/Superminis
- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Office Automation Systems

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IBM's Disoss Links Office Architectures

By Paul D. Morris

Office systems integration is currently a very active topic. The computer industry has focused a great deal of attention on IBM's Distributed Office Support System (Disoss), which is IBM's document library and distribution software product. There is, however, a great deal of confusion and misunderstanding surrounding the role of Disoss. Many people believe the role of Disoss is format translation, but this is only by default. The true role of Disoss is to provide an integrated office environment for all IBM office products across a standard set of architectures.

We must first examine the factors that made format translation necessary in order to understand the role of Disoss in format translation. This entails tracing the history of Disoss, how it has matured and where it is going.

Disoss was first introduced in late 1978, in support of IBM's 3730 Distributed Office Communication System. In the summer of 1980, however, the real Disoss emerged in support of the IBM 8100 Information System. This implementation allowed text documents that were created by the Distributed Office Systems Facility (DOSF) on the 8100 to be stored in a Disoss host-based library. Disoss allowed for the archiving and retrieval of these documents as well as the automatic distribution (sending) of these documents to other 8100s in the network. During this period, format translation was unnecessary because all the text documents were created by the same word processing application (DOSF) and displayed in a single presentation format.

At the end of 1982, the first version of Disoss Release 3 was introduced along with two sets of protocols to support IBM's office architectures: Document Content Architecture (DCA) and Document Interchange Architecture (DIA). DCA defines the structure under which all IBM documents will be stored. DIA defines the rules to be used by all IBM office systems when sending documents to and from one another. This release, in addition to supporting the 8100 with DOSF, also included support of IBM's 6580 Displaywriter with Textpack, IBM's 8815 Scanmaster and IBM's 5520 Administrative System. Incorporating various office system and software products into the Disoss network created the need for translation or transformation of documents from one product format to another.

Three types of format translation were identified: translation due to software restrictions, translation due to hardware restrictions and translation due to information structure restrictions.

The hodge-podge integration plan of IBM in its OA product line and the enormity of the task of standardizing its product lines has forced Disoss into the role of format translator.

Software Translation: The various office automation software products included in the Disoss network (such as DOSF and Textpack) were created by different groups within IBM to address separate and distinct needs, with little concern for total system integration. Therefore, wide discrepancies existed in the capabilities of each software product. For instance, the capability to set margin widths or tabs may drastically vary from one OA software product to another.

DCA was developed by IBM to overcome this problem by defining the standards for specifying the contents of a document at two different levels: DCA Level 3 (revisable form) defines the formats to be used by all IBM document editing software applications, thus resolving translation conflicts and DCA Level 2 (presentation form) defines the formats to be used for the presentation of documents in noneditable form on printer or display devices. However, not all current implementations of IBM OA software products use DCA, nor have all products been upgraded to full DCA capability. Therefore, discrepancies exist and Disoss's role by default has been to take care of these discrepancies (for instance, by translating DOSF formatted documents to Textpack formatted documents).

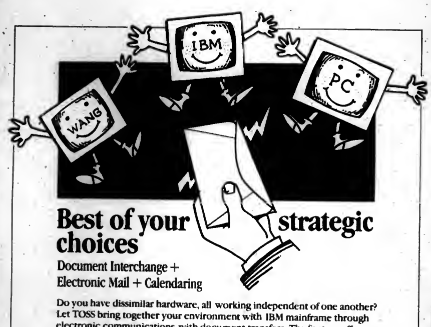
Hardware Translation: Hardware and software translation normally go hand in hand, as most IBM OA software products are designed with the hardware in mind. However, as product independence is becoming more prevalent, this can cause problems that require translation. For example, an accountant could create a document on a color terminal with red indicating a loss. When distributing that document to a noncolor terminal, the highlighting effect would be lost unless a translation was performed to convert red areas to highlighted areas. Disoss's role would be to perform such translations.

Information Structure Translations: Within a compound document, data, text, image, graphics and voice can all be combined as a total document entity. However, certain devices cannot handle certain information structures. In the future, therefore, a voice message will have to be translated to a text message when distributing from IBM's Audio Distribution System (ADS on a Series 1) to a Displaywriter. Disoss could fulfill this role, although it is also possible that IBM will decide to handle these differences at each office system product because they will all recognize a common DCA structure.

So, as we can see, the hodge-podge integration plan of IBM in its OA product line and the enormity of the task of standardizing its product lines has forced Disoss into the role of format translator. Will this continue? Certainly, over the next few years. However, as IBM's overall OA strategy unfolds, the role of Disoss in format translation will cease to exist.

There are a number of reasons for this. First, IBM appears to be standardizing on one OA software product line, Displaywrite. Displaywrite software was first introduced for the IBM PC and closely resembles Textpack, which runs on the Displaywriter. In October 1984, IBM also announced Displaywrite support for the IBM System/36 as well as Displaywrite support for host System/370 systems both under the MVS and VM operating systems. By standardizing on one product with one set of presentation services, the anomalies between different IBM OA software products are resolved, thereby eliminating the need for Disoss-based software translation. An integral part of this strategy, however, is still the full implementation of DCA across all Displaywrite software.

Second, the strategic implementation of IBM's Office System family is based upon Systems Network Architecture (SNA) L.U. 6.2 session protocols, which allow for peer to peer communication and document distribution across dissimilar IBM OA hardware products. This implementation improves oetwork efficiency by alleviating the requirement that document distribution go through a centralized host system running Disoss. Hardware translation can therefore no longer be performed at the host system (for



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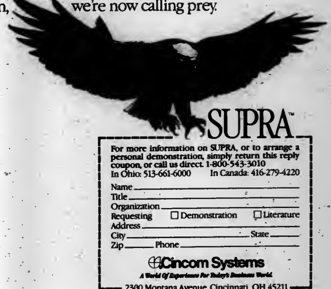

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example, within Disoss), but must be performed at the remote system, eliminating the need for Disoss-based hardware translation.

Third, full implementation of DCA takes into account voice, data, graphics, image and text, thereby eliminating a future need for Disoss to perform information structure translation.

A further role of Disoss is to support a marketing strategy intended to make IBM OA products the de facto standard in a corporations's integrated office approach.

It becomes obvious that the role of Disoss in format translation, a feature it was not originally designed to perform, will cease to exist. What then is the true role of Disoss? Essentially, the original goal of Disoss still prevails: to integrate the office environment by supporting all IBM's office products through a standard set of architectural rules (protocols). This integration consolidates both the logical and the physical characteristics of the office environment. Logically, a compound document format will integrate all five logical entities of human expression — voice, data, text, graphics and image — while physically supporting the hardware characteristics of the incoming generation of integrated voice and data terminal/personal computer (IVDT/PC) workstations. This integration is already becoming a reality through the IBM/Rolm Corp. connection with new add-on voice boards such as Juniper and Cedar. Disoss's role in this integrated office environment will be to provide a standardized software solution to large-scale storage (archiving) of compound documents and the distribution (mailing) of messages and compound documents across all network users.

In its current form, however, Disoss is too cumbersome and centralized to fulfill this role. Certain enhancements need to be considered. These include the following:

- A Disoss-type of functionality needs to be implemented by all vendors of departmental office systems, including IBM, in order to provide archival and distribution services at the departmental level similar to that which is currently provided by Disoss at the host level.
- A more efficient data base management system (DBMS) — especially on the host (probably DB2), but also on the remote — needs to be implemented to satisfy document archiving functions.
- A more efficient operating environment is needed for Disoss, essentially a leaner CICS configured specifically for the asynchronous batch flavor of Disoss. Such a system would allow higher performance through separation from the interactive nature of terminal-driven transaction environments.
- Full integration of Systems Network Architecture Distribution Services (Snads) across all Disoss supported products to ensure resolution of today's chaotic user directory maintenance function.
- A tag system to facilitate movement of an individual's or department's documents from one system to another without an impossible administrative update task.

A further role of Disoss is to support a marketing strategy intended to make IBM OA products the de facto standard in a corporation's integrated office approach. Although Disoss has been available for four years, not one non-IBM OA vendor has succeeded in integrating office products with Disoss. The task of integrating to Disoss is monumental, with IBM utilizing three new architectures (Snads, DCA and DIA) over and above SNA, which has been the major focus for non-IBM vendors in the past. Additionally, the rate of change — architecturally and productwise — within IBM's Office System family will only continue to complicate this task. For instance, in order to achieve their compound document strategy, IBM will have to publish a substantially revised DCA, which will severely impact the DCA development that non-IBM vendors are currently implementing. DIA requires the SNA LU6.2 session protocol, which potentially is as large a development task for the non-IBM vendor as the development task IBM encountered for its own Network Control Pro (NCP) on its front-end processors.

It is therefore unlikely that within the next two years non-IBM vendors can adequately interface directly to Disoss. Unless they pursue tactical solutions from third-party software vendors, their ability to compete in the integrated office environment will be negatively impacted.

Morris is national sales vice-president of Software Research Corp., a network software product and consulting company in Natick, Mass.

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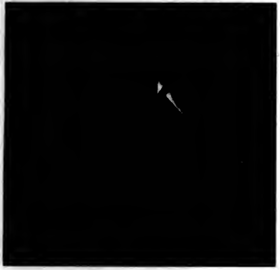

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The Impact of Unix In the Office

By John Butler

During the last decade, the demand for new technologies that will improve the productivity of office workers has significantly increased. But these new technologies must provide certain benefits in order to serve the needs of end users as well as to be successful in the marketplace. Recently, Unix has emerged as a potential operating system for office software systems.

Let's take a look at the benefits to end users of transportable Unix-based office systems and emerging trends in application software.

Transportable Unix-based office systems will benefit the user in several major ways. First, the user will ultimately be able to run a single office system across a wide range of different hardware in the same facility. For example, Digital Equipment Corp. VAX and IBM Personal Computer AT and 4300 series systems will all be connected to a local network running the same office system. This is significant because very few users are able to have all their needs met by a single hardware supplier. Due to the nontransportable nature of previous office software systems, the flexibility of being able to provide users with a wide range of hardware solutions and a common software environment has not been available. Transportable office systems will allow companies to use the most cost-effective hardware solutions while maintaining a uniform user interface to the system.

Transportable office systems allow close organizational integration across divergent hardware by running the same software on all systems. Although software-to-software gateways and interchange formats will be important to future office systems, they are not a substitute for a single integrated system. The professionals who use these systems require a single user interface and smooth seamless methods of working in groups, which can only be provided by truly transportable systems.

A second major benefit of transportable Unix-based office systems is that they separate the office software decision from the office hardware decision, thereby reducing the risk of either decision. Transportable software ensures that the company is not tied to a single hardware vendor.

Transportability also stimulates the development of better software by creating a market for third party suppliers.

PHOTO ©1985 GEOFF O'CONNELL

The number of companies currently developing software for Unix makes this evident.

Another advantage is the reduction in hardware prices to end users. Because hardware can be substituted more easily, it will be priced in a more commodity-like manner. As a result, low-cost hardware suppliers should increase their market shares.

The next generation of office software is ironically being developed for Unix precisely because this operating system has seriously lacked applications software in the past.

There are three important areas of new technology rapidly emerging. The first involves greater use of computer intelligence. This will not be a dramatic jump into artificial intelligence, but rather a longer trend of assigning the mundane to the computer and more creative tasks to humans. Examples of this change will be seen in the way text is edited and in the unification of all graphics and image editing.

Text will be edited using a much more advanced approach than that available from contemporary word processors. Documents will be formatted automatically as the user enters text. This will be accomplished by applying rules captured in a reusable style description. These style descriptions will be shared among users so that all documents produced in an organization automatically have the same look. Managers and professionals can create documents that meet the organization's standards without the need to master word processing commands and concepts. Graphics and image editing will be unified under a graphics editor that will provide a freestyle drawing capability and will be an automatic drawing agent for all graphical output. The user can directly edit both graphics and images at any time using this universal graphics editor.

A second change that will take place in software technology will occur as office systems move from passive to active agents. This change will allow the system to monitor information to which a user has access and, upon recognizing a user-described condition, take a user-requested action. For example, all changes that are made to a shared document (a project plan) can trigger the system to mail the modified document to the project team members.

New technology will also allow the user to mix and edit arbitrary kinds of information in a document. Most current office software permits a single document to contain just one kind of information such as spreadsheet or graphics, but not several kinds in combination. Some software permits the user to add a preexisting graph to a text document, but in most, once a graph is added it cannot be graphically edited without returning to the source document, which has a separate location in the filing system.

The new technology will allow the user to combine text, graphics, spreadsheet and any other kind of information in one document and yet edit them in their native mode. The user can draft and edit documents in a natural way. As ideas are drafted, the user will be able to see the entire document take shape at once, knowing any part can be easily edited.

Unlike today's personal computer-based information support tools, the new generation of OA will provide for network-based information sharing.

One of the major motivations behind the spread of office automation systems is the efficient and effective information sharing they can provide. Unlike the present generation of personal computer-based information support tools, the new generation of OA will provide for network-based information sharing. This includes the basic mail and calendaring facilities, but will also include the ability to mail any type of information in its native form. This will allow the recipient to readily modify, expand or replace any part of the information and reply to or forward the changes to other members of the work group. Thus, effective work group and intergroup functions are naturally available, even if the groups are spread across multiple locations.

A final trend being observed in the new generation of OA software has been dubbed open architecture. This is a software design that is open to the addition of new applications while providing consistent usage and integration with existing applications. This will allow the easy integration of diverse applications from multiple sources while preserving the overall user interface and system integrity.

Advanced applications software such as that discussed above can greatly improve the productivity of office workers. When such technology is available on a transportable system, the benefits are even more dramatic.

Butler is vice-president of marketing for Applix, Inc., a company that has completed the development of a Unix-based office software system called Alis.

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Where Is The Electronic Messaging Explosion?

The technology has been ready and waiting for some time. Are messaging systems finally going to happen for large groups of users? Only if the office workers receive education as well as the technology.

By Stan Kolodziej

Since its introduction in 1980, electronic messaging has shown respectable if not spectacular growth in U.S. offices. Installations of electronic mail in the U.S. have climbed to 300,000, according to Venture Development Corp. (VDC), a Wellesley, Mass., research firm. Respectable, but certainly not the kind of figures vendors of electronic messaging were touting a few years ago.

Though part of a varied set of transmission media including facsimile and Telex, electronic messaging has gained market penetration in two areas: computer-based messaging systems and subscriber services from communications and time-sharing companies. Computer-based messaging systems are increasingly used as value-added products on private branch exchanges (PBX) and computer systems. A good part of this market is made up of the many electronic mail software packages sold through microcomputer retail stores. The second market consists of companies such as MCI Communications Corp. of Washington, D.C.; Western Union Telegraph Co. of Upper Saddle River, N.J.; and ITT Dialcom, Inc. of Silver Spring, Md.

Electronic messaging is simple to use (a few keyboard commands and modem or telephone are the usual requirements), reliable and reasonably cost-effective — for those reasons endearing itself to its corporate users and corporate budgets. In fact, recent studies indicate a mini groundswell in electronic messaging sales might now actually be underway.

A recent report from VDC stated that "despite uncertainty as to exactly what type of computer-based message system is most appropriate for their needs, close to 60% of current nonowners [of electronic messaging systems] contacted in our sample indicated they plan to acquire a system within the next two years."

Similar projections bolster the immediate outlook of electronic mail subscriber services. A report from the Omni Group Ltd., a New York consulting firm, pointed to the fact that while 62% of the Fortune 1000 corporate respondents already have long-distance messaging in place in 1985, that figure is expected to jump to 71% in 1986. Of the remaining 3,000 largest service and manufacturing companies, while only 39% currently subscribe to electronic messaging services, fully 66% indicated they would have services in place by the end of 1986.

A 1984 survey conducted by consultants Eastern Management Group in Parsippany, N.J., found 83% of the largest U.S. business communications users will require extensive electronic mail capabilities by 1987.

"Electronic mail is a natural for large companies. They are geographically dispersed and have long-distance lines already in place," David Cushing, associate director at the Omni Group, explained. "The brunt of the new demand is from smaller companies that see electronic mail as a way of squeezing more use from the rash of recently installed personal computers."

Once installed, however, electronic messaging is rarely used as much as it could be. Analysts agree it is more a marketing problem than any inherent limits in the technology.

"The responsibility of educating users [of electronic messaging] lies with the vendors and corporate data processing departments," said David Dell, director of research at the Diebold Group, Inc., N.Y. "It's not just educating the user, however, it's bringing out new uses of the service. The same computer system handling electronic messaging, for example, can also be used to keep users up-to-date on corporate policy and resources such as disposal of planes and cars, create in-house bulletin boards and monthly expense reports. Sending memorandums and letters are not enough. Users should be able to create their own uses and addons."

According to Leone Pease, a market research analyst with VDC, "the major subscriber companies have done a good job at raising the number of people who have electronic mailboxes, but a bad job at defining the role of electronic messaging in user sales forces and other groups."

There are some technical hurdles to overcome. Electronic messaging is often installed on a departmental rather than an organizationwide basis. This can lead to some incompatibility problems involving installed computer equipment from different vendors. Terminal-to-terminal communication requirements vary per vendor. Until the wide acceptance of communications standards for electronic messaging such as the X.400 from the Consultative Committee on International Telephony and Telegraphy (CCITT), the spread of corporate electronic mail will be slower than its potential.

Despite these problems, computer-based message systems are expected to climb to nearly two million installations by 1990. Packet-switched subscriber services are also expected to fair well during the next five years. After a predicted small hiatus in growth during 1985-86 (caused by a market adjustment following the sales success of vendors of subscriber services in the 1982-84 period), the Boston-based research firm, Yankee Group, posits an annual growth of between 30% and 35% until 1990.

When should a company choose computer-based systems over subscriber services? Both have advantages and drawbacks.

Computer-based system vendors offer the advantages associated with a fixed cost solution. Once a system is installed, no additional cost per transmission will be incurred.

Subscriber services, on the other hand, are well-suited to communication outside the company and relieve the user company of the burden of network administration and maintenance. Most subscriber services also provide hard-copy delivery options. A message can be sent electronically and delivered to an electronic mailbox in a computer, terminal or word processor or that same message can be transmitted to a printing facility close to the recipient, then hand-delivered by courier.

"With computer-based electronic mail becoming cheaper and easier to use," Dell said, "it's like a car option that has suddenly become a value-added necessity."

Large systems vendors such as Digital Equipment Corp. of Maynard, Mass., and Data General Corp. of Westboro, Mass., have provided electronic mail for years. It could be said, in fact, that almost no major large systems vendor would be viable in the market today without an electronic mail offering. Many companies use it as a key entry point for reluctant managers cutting their computer teeth.

In the field of business personal computers, electronic messaging packages have been an intensely competitive industry for over three years. Some of the front runners include Access from Microsoft Corp. of Bellevue, Wash.; Crosstalk from Microstuf, Inc. of Roswell, Ga.; Smartcom from Hayes Microcomputer Products, Inc., Atlanta, Ga.; and Personal Communications Manager from IBM, Armonk, N.Y. Most of these electronic messaging/communications packages have come down in price during the past year and have settled in the $100 to $200 range.

Packet-switched subscriber services are also becoming competitively priced due in part to price pressures caused by new vendors such as Echo of Marina del Ray, Calif., and time-sharing company GTE Telenet Communications Corp. of Reston, Va.

MCI Mail, for example, has recently introduced MCI Link, an interface product designed to join a customer's internal mail services with the outside world, providing access to other internal and packet-switched electronic mail networks. "Users now expect more than just simple electronic mail," Bill Stern, MCI Mail's public relations director, explained.

Western Union has also been intensifying efforts to provide customers with interfaces to computer vendors' systems, including DEC's All-In-1, Sperrylink from Sperry Corp. of Blue Bell, Pa., and IBM's Distributed Office Support System (Disoss) and Professional Office System (Profs) environments. It has also introduced a software package for microcomputers called Instant Mail Manager, which provides the interface with the Easylink electronic mail service and information data base retrieval services, along with handling word processing.

Western Union is also planning a big splash for the press in late October to introduce a product that Roy Andersen, vice-president of Easylink, has termed a "friendly front end" for hundreds of outside data base retrieval services.

"The user will log onto Easylink at a terminal or computer and then key into the data base services function," Andersen explained. "If users know what sort of information they want but don't know where it is, the new service will automatically scan several data bases to find it." This new service will cost about $10 a search, Andersen noted.

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keeping pace with its new communication bridge between IBM's Profs and GE's Quick-comm electronic mailbox service.

One study predicts the number of managers using installed electronic mail facilities could increase to 43% in 1986, indicating at least a verbal nod (if not capital commitment) to the importance of electronic mail in the managerial work force.

Who uses electronic messaging? "Everyone from the big corporations to mom-and-pop shops," MCI's Stern said.

At Computer Communications Associates (CCA), a Cambridge, Mass., software company, employees from executives to support staff use a variety of Ascii terminals to send electronic messages to each other and to customers. The system, called Comet 11, was developed at CCA in the late 1970s. Tied into long-distance lines, CCA has extended its electronic mail to customers around the world.

Chris Stone, product manager of DG's Comprehensive Electronic Office (CEO), said the primary reason for electronic mail was "not to exchange short messages, not to decrease telephone tag, but to move documents between terminals." And that, Stone added, is a clerical and middle-management function.

The Omni Group's research found that a majority of its clients use electronic mail once a day, though some use it several times daily. It also found that while only 19% of these managers use installed electronic mail facilities today, that number could increase to 43% in 1986, indicating at least a verbal nod (if not capital commitment) to the importance of electronic mail in the managerial work force.

Another messaging technology also gaining corporate business is voice store-and-forward (VSAF). Recent advances in digitizing and compression of voice have analysts at least cautiously optimistic that VSAF might finally take off in the office. "Voice mail has two distinct advantages over electronic mail," Kenneth Bosomworth, president of International Resource Development, Inc. (IRD), a research firm in Norwalk, Conn., explained. "Keyboarding is not necessary, and the installed base of telephones is massive." VSAF is being marketed in three areas: integrated with PBX, as stand-alone workstations or terminals and as add-on board options.

Bosomworth also said that decreases in computer storage costs along with gains in voice compression technology have offset some of the disadvantages of VSAF, enough to now make it a viable means of office communication, "especially for the exchange of short messages requiring a minimum of interactivity."

Voice messaging is not cheap. Though prices are dropping, most small VSAF systems cost over $50,000, and larger systems run much higher. One corporate user of IBM's Audio Distribution System (ADS) recently paid nearly $200,000 for the installation of a system and the setting up of an ADS training program.

There are exceptions. For under $1,000, for example, Natural Microsystems, Inc. of Natick, Mass., will provide a plug-in board for IBM Personal Computers, which provides minimal voice mail capabilities (a hard disk is recommended). Most vendors agree with DG's Stone, however, that the high costs associated with voice messaging make vendors target upper-level management users, whose legendary wariness of keyboards might be a plus for VSAF systems. "A good deal of voice messaging's appeal to executives," Stone said, "will rest on the fact that most user interfaces are the same as those currently being employed . . . namely push-button telephones."

Weathering a slow start, VSAF has begun piquing the competitive interest of computer and PBX vendors. To win over some of the entrenched base of business electronic mail users, however, most analysts agree that voice messaging in itself will not be enough. To make inroads, VSAF systems will have to combine voice messaging with text and data applications in an integrated office environment. Features such as voice annotation (automatically embedding voice messages within documents) and the ability to create master directories for both text and voice messages are part of this necessary emphasis on integration.

To accomplish this, however, required VSAF vendors to expand into areas outside their expertise, usually with poor results. Witness the good voice messaging but poor DP abilities of Northern Telecom, Inc.'s Displayphone and the rocky start of Wang Laboratories, Inc.'s Digital Voice Exchange (DVX) system.

The DVX system was introduced in 1981 by Wang Laboratories of Lowell, Mass. Wang, along with IBM (with its ADS) was the first office system vendor to offer a voice messaging system as an extension to its office products. Though it has been continually enhanced, DVX still only has about 200 installations.

That does not seem to discourage Bill French, product manager at Wang. "The spectrum of voice messaging users is opening up," French claimed, adding that the market is like an inverted pyramid, with the middle of the pyramid representing corporate management — the major market for VSAF.

Hinting that Wang has both barrels pointed to future advanced VSAF products integrating the company's WP expertise, French said the company has been busy bolstering its engineering staff and working on voice recognition products that would turn voice not only into text, but "text into voice."

DG has already come out firing, however, with its own integrated VSAF product. The Dasher D555, an integrated voice data terminal, modeled after the company's Dasher D460 data terminal, is slated for introduction in late October and will operate within the company's CEO office automation environment.

John Purcell, DG's product manager of terminals, said the D555 comes with a 9-in. screen, eight user-definable soft function keys, an integrated telephone and half- or full-duplex speakerphone. Purcell stressed the D555 can handle all DP and WP functions available on CEO and will also include one RS-232C port for data communications and a separate X.25 port for analog connection with PBX, effectively remedying the security problems of having voice and data sent out over the same lines. "If the CPU goes down," Purcell explained, "you'll still have voice capabilities."

DG has made its voice messaging easy enough for its slated target market of executives. To add a voice annotated message to a text message, for example, the user presses a voice key to activate the voice editor for input. A pop-up menu prompts the user through the creation, reply or forwarding of voice annotated messages.

PBX-maker Northern Telecom of Minneapolis, Minn., is one of the few communications companies offering switch capabilities, voice annotation and voice store-and-forward functions within an integrated PBX and OA environment.

Its Displayphone pointed out the early problems of some communications companies trying to integrate data and text with their communications skills. That might also be changing. Northern Telecom's Meridian SL-1 and Meridian PTE, its transport system, are still in development and not slated for commercial shipment until early 1986. A preview, however, shows a system promising some sophisticated voice annotation and store-and-forward capabilities combined with Northern Telecom's Q-Office WP environment.

Under IBM's monetary umbrella, Rolm Corp. of Santa Clara, Calif., will be selling many more of its Phonemail systems, especially in light of IBM's recent dropping of its ADS voice messaging system in the U.S. market in favor of the Rolm system. Though the Phonemail system interfaces with Rolm's computerized branch exchange (CBX) and can be attached to other PBX through the company's PBX Interface, the real question will be the company's ability to tie the Phonemail to prevalent IBM office environments such as Disoss and Profs. Doing this would greatly expand Rolm's VSAF market and market share.

In fact, this same strategy will no doubt be applied by other VSAF vendors as they come on the scene. As with most areas of the computer and communications industries, companies quickly learn that tying into the huge processing environment IBM has put in place is also a good way of tapping into huge profits.

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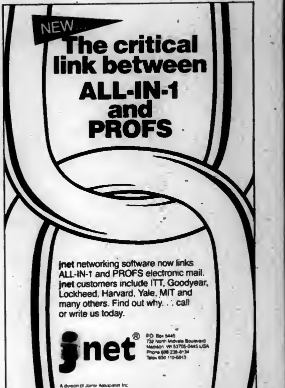
Kolodziej is a senior writer at Computerworld Focus.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XI
LA FORCE

Does MIS Hold All The Cards?

Detente between office automation and DP factions is critical if true automation is the corporate goal. But no one ever said peaceful coexistence would be easy to accomplish.

By Lee White

It doesn't take a seer and a pack of tarot cards to predict the direction in which office automation is heading.

The disruption of the office automation function—its people, its hardware and its systems—is no longer an isolated incident. Nor is it a trend. It is, according to consultants, users and surveys, a fait accompli.

"As recently as five years ago, MIS (management information systems) had little clout in buying office computers. But MIS flexed its muscles and wrested control away from user areas," said Randy J. Goldfield, president of Omni Group Ltd., a Butler Cox company specializing in information technology research and consulting issues.

Warren Waldbrand, Omni's director of research, conducted a major study of office technology planning and purchasing in Fortune 1000 companies. The resulting report, "Techtrends '85: Inside the American Office," found that MIS departments have gained control in the majority of the surveyed organizations. Waldbrand found that 39% of the surveyed companies have standing OA committees which have OA policy setting authority. And while representation on the committees is made up of many departments, MIS is not only disproportionately represented, but its influence is even greater than its representation.

Wresting of control of OA from the administrative (read *word processing*) area has been and will continue to be difficult

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but Amy Wohl, president of Amy Wohl Associates, stated that the transition was necessary. "Both the MIS departments and the companies realized that OA is very intimately connected with getting information out of data bases, riding the same networks and using the same workstations. At that point, it is not particularly surprising that people would say, 'OK, MIS, if you have to figure out how this all fits together, why don't you just be in charge of it?' "

It is not particularly surprising that people would say, 'OK, MIS, if you have to figure out how this all fits together, why don't you just be in charge of it?' "

Some organizations have managed the restructuring with little pain. Carolyn Giovannini, manager of operations for the 900-person Department of Community Affairs for the state of New Jersey, spoke with pride of the manner in which her department effected change. In her department, she heads up the OA function and another manager has responsibility for the data processing systems group. Each position reports on an equal basis to a director who has responsibilities beyond the OA and more traditional DP groups. "We have chosen to keep them [OA and DP] separate yet together. Integrate all that we're doing together, yet not have an MIS group so that office automation gets lost in the data processing world," Giovannini explained.

Giovannini thinks part of the success is due to the equipment chosen. Because there were overlaps with data bases that both groups needed, but did not need to reside on the mainframe computer, they looked for equipment for a particular application with the understanding that not too far down the road, the system would also be used for DP and WP, true information management. They chose the Wang Laboratories, Inc. VS system.

Because of the versatility of the equipment and its proprietary software, Pace, Giovannini's staff is as involved with the applications side as the systems people. "Our staff, which is the information center staff, will develop all the applications. We put together a staff, a person from the operations side and a person from the systems side, who will work together. When the documentation is finished and the training completed, the applications will be given to the user to maintain. Operations and Systems will be the consultants, the handholders, the troubleshooters for the users," Giovannini said.

However, the Three-Musketeerish experience that Giovannini recounted was not echoed by Richard Struense, who until recently was manager of the Information Center for Federal Express Corp. in Memphis, Tenn. During his 6½ years at Federal Express, he saw the separate function of OA become part of his information center. The process was a painful one, although Struense said that personality conflicts and internal politics made it more difficult than it had to be.

There were two opposing factions (OA and information center) that were very strong and very separate, Struense said. Each chose the vendor which was strongest in its field — Wang for OA and IBM for the information center's mainframe and end-user computing tools. Each group went on its own very successful tangential way.

The problems really began as users became more sophisticated and began to want to do things with the available tools. Many of the users had Wang terminals, and the 3270 emulation process didn't seem to work. "Things were working on the IBM side, but they weren't working on the Wang side," Struense explained. As the information center gained credibility because of the number of satisfied users, the OA side, with the limited functionality of the Wang workstation, lost ground. Complicating the situation was the fact that there were huge numbers of Wang workstations, including 12 Wang VS systems, all of which had been purchased outright. Resentment and conflict continued to build.

In time, members of the two functions came to realize that many users were common to the two groups and a decision was made to break the OA function into two groups, support and engineering. Support moved into the information center. Engineering stayed behind. "That split was perceived [by the engineering group] as a reduction of power. They had a hard time relinquishing some functions. They were not experienced with any of the other [than Wang] products. They didn't know how to consult or offer alternatives. Sometimes their

"...DEC is currently the market l
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Dataquest, Inc., June 1985
George F. Colony
Forrester Research, Inc.
Professional Automation Report, June 1985
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Research Associates
Office Products Analyst, February
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recommendations were in direct conflict with the goals or the corporate approach that had been established by the information center," Struense claimed.

Struense is now director of end-user computing at Hahnemann University Medical Center in Philadelphia. But much has happened since he left Federal Express. According to Struense, management at Federal Express has gone back on the road from whence it came and taken the OA support function out of the information center. Once again, there are two separate groups. Struense, from a distant standpoint, does not think the return to the old way will make anyone happier. At greatest risk is the user, he said. "[The two functions] will continue to develop within two networks and the particular vendor that was chosen for the office automation side will have as many technical difficulties as it did in the past."

While Federal Express jumped into the OA/information center arena and called it a day rather quickly, other companies are formulating complex organizational plans based on well-thought out corporate goals. Bill DeRosa. Information Center manager for the Chrysler Corp. in Detroit, said his mega-company is within a couple of months of resolving the issue. "The user community is starting to cross over," DeRosa explained. "The analyst that the office automation folks deal with is the same one that the information center and applications development staff needs. [The user] doesn't care who he's talking to. So now we. the information center and the office automation group, are faced with the concept of one-stop shopping."

DeRosa's information center presently has 30 people who support over 2,000 users with mainframe tools. The OA function presently supports about 500 secretarial word processors and about 1,000 personal computers. OA reports to end-user computing, which reports into MIS. Although he could not comment on definite plans that might hook OA to the information center, he said the primary thrust was to bring the support together with realignment so that individuals would have multiple responsibilities for both personal computer and mainframe tools.

Although most OA and information center or MIS staffers talk along the lines of peaceful coexistence, Ronald B. Bleiberg, manager of Advanced Office Systems for Emery Worldwide in Wilton, Conn., said the place for OA at Emery is most certainly not in the information center. At Emery, the information center staff evaluates personal computer software, trains people on personal computers and helps users with applications on mainframe software.

Bleiberg stated that five years down the line, the mainframe computer will basically be "a large diskette, a file server and communications traffic cop." As for the future of the information center, Bleiberg sees it merely as a subset of the larger end-user computing function. "Over the next few years, end-user computing will be substantial enough in size that it will represent 50% of all computing done in a corporation. The office of manager of that function will be equally important to the classical current data processing directorship," Bleiberg concluded.

Although most of the users who have been involved with the integration of OA and DP in their own companies talk primarily of the hardware/software/network connectivity issues, the people issues are equally important. As in the case of Federal Express, personality conflicts and fuzzy lines of authority can spell failure to a concept that, if implemented correctly, cannot help but benefit the end user and the corporation.

While people in positions of authority have the rank to make arbitrary and unilateral decisions, it is no secret that projects have a higher potential for success if all participants "buy in" to the implementation and eventual goals.

On the DP/MIS side of the coin, Wohl chides the profession. in general, for its lack of sensitivity. although she firmly believes "you can't have integrated office automation without having it intimately connected to information systems and services; therefore, it belongs in that department. We say to customers, 'If MIS has been a debacle in your company and the end users cringe when they hear it mentioned, we suggest you start office automation someplace else.' "

Jan Duffy, president of Duffy Consulting Group in Toronto, thinks overall responsibility for a successful office automation implementation should reside with a person accustomed to providing a service for the organization as a whole. "I'm still not convinced that there is sufficient depth in the data processing division for them to look at the organization and its business globally." Instead, Duffy said. the person responsible for designing. directing, managing and owning the system should be someone who has a dotted-line relationship to those two [OA and DP] departments. "We have recommended that that person exist and that the job be reevaluated after three years to determine where in fact the responsibility for the entire system and its management lies," Duffy said.

And what happens to the management of OA once it is absorbed by MIS? Bonnie Kline, president of the Association of Information Systems Professionals (formerly the International Word Processing Association) thinks that each function has much to learn from the other and, indeed, each can perform tasks in which the other has little interest. People who have grown up in the OA ranks tend to be more people oriented and to understand the user's needs better, while the DP professional is typically more technically oriented and has extensive expertise in hardware and software, Kline said.

Kline cautions, however, that the traditional OA person cannot rest on past laurels. She stated if the OA people are to survive in the new world of system integration. they must learn the language of their counterparts, understand the workings of the popular software packages, take some DP courses, learn to use the systems with telecommunications and subscribe to the major personal computer and DP publications. "The office automation people need to seek out a new career path or extend the present path to include the data processing/MIS world. If they don't, they better look for a whole new area to work in because they won't survive," Kline said.

To ensure something beyond mere survival, something along the lines of real decision-making authority and a career path up a ladder instead of a treadmill, the OA person has to be assertive and aggressive. As Giovannini stated: "I had to fight, and I had to grope. We have to start to build another niche for ourselves and to grow beyond our word processing backgrounds. It is incumbent upon us to take a look around, see what is happening and begin to broaden our horizons and expand."

It is indeed a new world out there. As Dennis Lockard, manager of End User Support Services at Corning Glass Works, stated in a talk on change management at the 1985 Information Center Conference and Exposition in Nashville, Tenn., "The secretary of tomorrow will be more likely to start her day initializing a local-area network than making a pot of coffee."

White is a senior writer at Computerworld Focus.

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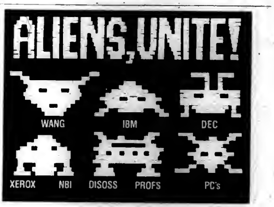

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You *Can* Justify Office Automation: A Methodology

By David L. Shay

Many people claim you cannot justify office automation; I say horse feathers!

OA is easier to justify than the last time you spent extra money on an overnight delivery service when your package simply had to be 300 miles away. OA is easier to justify than the last time you planned an off-premise conference at a local hotel in order to get people away from their phone calls, so they could concentrate on the subject on hand. OA is easier to justify than when you took your subordinates out to lunch to show your appreciation for the extra effort they had put in on the last project.

You justified those actions on the basis that they made business sense; they were reasonable. Think about it. Could you have justified those decisions on hard dollar arguments? We justified the overnight courier on the basis of competitiveness; the off-premise conference on increased quality of the output; and the luncheon, on the basis of a reward for past performance (but with a big hope that we could get extra productivity some day in the future when we need it). But when our boss asks us to justify OA, we throw up our hands because we cannot find enough hard or even soft dollar savings.

Why do we do that? We do that for the following reasons:

- We tend to equate the word justify with hard dollar rationale rather than business reasonableness.
- We have a certain latitude as trustworthy employees to spend $17, $35 or $300 of the stockholders' money, but we do not have that latitude for $2 million of OA expenditures.
- Most of us who have gravitated to the systems professions have personalities that prefer to see in-depth studies with many charts and graphs and alternatives and numbers that tie together. Systems people have a lot in common with engineers and accountants in this regard.
- Most of us shy away from OA justification because we have not yet seen any good justification methodologies.

The most popularized methodology in use accounts for people's time by using a lexicon like, "How much time do I spend creating, keyboarding, telephoning, filing and so on?" We ought to be leary of this lexicon. The lexicon can be used as a diagnostic (to show you how people generally spend their time), but it doesn't tell you anything more beyond that.

What we need to have available to us is an OA justification methodology based on a business rationale, but backed up by an appropriate amount of charts and graphs that show we did our homework.

An alternative is a methodology I call "80/20 OA," which consists of the following:

☐ ***Establish the need:*** Our OA proposal will be signed off in the executive suite on a business case basis; therefore, the first step to justify OA on a business basis is to understand the business. Most people fail in this step because they write their documentation to appeal to their own logical and personality needs that are technology-based, not business-based.

Executives with sign-off power have nontechnology "hot buttons" such as market share, competitiveness, cost control, value added, new products and services or hiring and retaining good people. Read the business plan; find out what the executives want. How are they measuring their own success? I can guarantee they are not interested in your problems concerning standardizing on vendors, local-area networks or downloading from a host computer.

They are interested in bringing a new product to market, three to six months faster, to gain profits earlier and/or preexempt competition. They are interested in holding the line on the spiraling white-collar costs. They are interested in bidding on more jobs and getting quality proposals out the door faster. They are interested in locking in customers with some product, faster and better service or value-added information that will make customers give you more business. Undoubtedly, one of the many OA technologies can enhance your company's position in one or more of these areas.

By learning about management's "hot buttons," you have just completed the first step in the 80/20 rule of justifying OA. You have now identified the 20% of the company's activities that account for 80% of management's attention, interest and the areas they are likely to fund money to improve.

☐ ***Identify the key work efforts:*** Now you need to know what employees do to deliver. Again, using the 80/20 rule, your job is to find out those few key work efforts that individuals or teams of people do to satisfy those needs. Let's take writing a proposal as an example. It might take a month to write a proposal with a team composed of a manager, two engineers, an artist, an administrator, a secretary and word processing/editing center, for a total of approximately 360 hours.

If you interview the team from a time and motion perspective, which is what many OA justification teams do, they will tell you about the 80% of their effort in writing and keyboarding the proposal.

This is the pitfall that will trap you into studying issues that are nonissues to management. If you interview them from the business perspective, you will find that the most critical 20% of this time is spent on the following:

- Researching the company's qualifications to bid on the proposal and converting these strengths into the main strategy for the proposal.
- Planning (budgeting and scheduling) for the proposal effort itself so that everyone understands their tasks, time and outputs and everything falls into place in the allotted time.
- Reviewing and controlling the work of others at key checkpoints, personally or in review meetings.
- Pricing the proposal for the customer, which is based off the exercise of costing the proposal for ourselves.
- The final push when everything comes together and all the wordsmithing, charts and graphs and overview/summaries are written. This is when fast turnaround is critical.

These are the terms and tasks management understands. These 70 or 80 hours are the make or break hours for the company, not the other 80%. This is where management's adrenalin flows, and in these following areas you will make your business case for OA:

- Researching: OA can provide a textual data base of prior proposal information that will allow the team to search for which prior proposals were for similar industries, sizes or situations. Now you will know your strengths and/or weaknesses so that the best strategy, tone and emphasis of the proposal can be set fast, allowing more time for other activities.

OA can provide a tremendous amount of boiler plate that exists in those proposals on company strengths, approaches and qualifications. Over 80% of the time to write these can be saved and put on other efforts because it is merely a cut-and-paste exercise. Much of the non-boiler plate material in these earlier proposals can also be used, perhaps saving 30% to 50% of the time to write that.

- Planning and scheduling: OA can supply scheduling and project planning software so that the proposal effort can be planned and tracked and revised, if necessary. This can be very helpful on smaller proposals and absolutely invaluable on large proposals.
- OA can also provide graphics so the plan can be communicated using block diagrams or gantt or Pert-type charts. One of the most probable places for a proposal effort to get off course is when the manager hands tasks to subordinates. A comfortable desktop control system would be invaluable to keep control.
- Status review: OA can supply many strengths to make checking the work of others more effective. There is tighter control by publishing a schedule with milestones and asking people to report on progress (manually or electronically). Preparation for meetings is easier and consumes less time with electronic assists such as electronic mail, voice mail, project scheduling software and possibly time reporting software.
- Costing and pricing: OA can provide a downloading capability for the manager to obtain historical costs on similar jobs. OA can supply costing models and what-if models to help the proposal manager arrive at the best profit and lowest cost alternative, which will improve the capture rate on proposals.
- Final push: OA offers many advantages to people trying to pull a final document together. In addition to the obvious advantages of WP, OA allows for last-minute changes in charts, tables and graphs. Many people shy away from the use of tables and graphs because of the lengthy turnaround times to revise them through the art department. With OA graphics, people can prepare quality graphics without the assistance of an art department. The turnaround time is much less, and the unit cost is frequently lower.

In summary, you have now zeroed in on the 20% of the efforts that are important to management and have sensed the power OA can bring to the situation — the true business benefits of OA.

☐ ***Quantify the improvement:*** Improvements from OA are either tangible, intangible or both. Notice that I did not use the words hard and soft savings. Hard savings seem hard to come by, and most managers think soft savings are soft and fuzzy and don't like them.

Tangible savings can be quantified, usually in hours. In the above examples, the time saved by using boiler plate and some of the words in earlier proposals represents time saved.

The intangible improvements were from improved tools for costing and pricing; more effective planning, communication and control of the project; and more flexibility for adding graphics and revising text and exhibits in the final stage of the proposal. Fewer total hours needed for review meetings is a tangible improvement. More effective communication is intangible, but it should probably result in less rework — a tangible savings.

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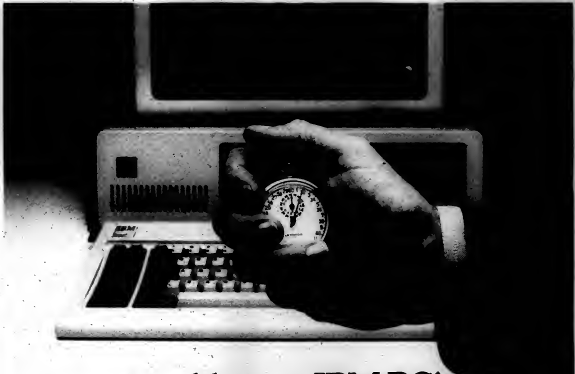

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of being able to run four what-if variations in a day rather than only one provides better information for better decision-making.

One of the simplest ways of capturing improvements is to ask groups of knowledgeable people who have used office technology to compare the way they used to perform their work effort before OA with how it happens after OA. Ask them to qualify the tangible improvement in hours, as in the what-if example above.

Then ask them to quantify the intangibles on the basis of high to low — perhaps on a scale of 5 to 1, with 5 being very high and 1 being low impact. In some instances, I recommend one ranking for all the intangibles. In some instances, I have asked for separate rankings for competitiveness, quality of the work and quality of work life. I have sometimes asked for further break outs if my reading of the business case in the first step told me that management had "hot buttons" in more than one area.

There will be many instances where employees will report that office technology can save them time, but they would like to plow that right back into their work. A good example would be with the what-if model above. Right now the manager spends one day going through only one complete manual costing exercise. The manager then looks over the data with an eye for lowering the cost and quotes the job at 10% less. That is no real what-if modeling. With the power of OA, the manager may want to go into some historical data bases and run the data through three or four different scenarios over a two-day period. That is what-if modeling.

The tangible savings from the two-hour OA what-if modeling is six hours saved over the old method of slow manual modeling. The intangible benefit from the improved accuracy and quality of work, more complete and creative planning and sharper-pencil, competitively, would probably be rated as a 4 or 5 on the intangible impact scale; the managers in the executive suite would agree.

A company we looked at recently resulted in tangible improvements for the one time $10 million OA investment, which added up to $8.5 million per year. That was based on 343,000 less hours required to perform the 100 work efforts — an equivalent of 171 full-time employees.

Only 13% of these improvements were in the secretarial/clerical ranks. Eighty-seven percent of the improvement from OA came in the managerial and professional ranks. In this engagement, the data gathered suggested that OA could help employees do discrete tasks two thirds faster, but the average impact on a full work day might be in the 10.6% range (50 minutes).

Productivity arguments are the arguments that make managers pick up pencils and sign.

Over the years, I have heard many people who were trying to justify OA get very frustrated when they could only find 20, 40 or 60 minutes a day freed up from OA. Their argument was, "So what if I save knowledge workers 20 minutes a day. They'll just go to the golf course 20 minutes earlier."

If you have done your homework as we described — you have the tangible and intangible benefits of OA in distinct work efforts times the number of times they occur per year, the old unit cost and the projected lower unit cost — management forgets about the golf course.

☐ ***Present key business benefits first:*** A persuasive argument is to present in a "want versus OA can provide" manner of presentation. An example is the following: Marketing managers want one more sales day in front of their customers per month. OA can provide one more day, a 50% increase in face-to-face selling time. Information such as this becomes the true selling justifications for your OA endeavor.

☐ ***Present key productivity benefits last:*** The "icing on the cake," the arguments that make managers pick up pencils and sign are productivity arguments. The productivity gains presented to management in this case study were relative to the business, plausible, defendable and consequently believable to management. They bought off on the improvement potential of OA for their business.

There is a reliable methodology for justifying OA, and we have successfully used it several times. It is not in pilot test, it works.

Establish need. It starts with uncovering what makes a business tick, where are the management needs, where are management's "hot bottons." These will have nothing to do with the problems, opportunities or challenges of installing technology. They are business needs. Defining those needs will direct you to those 20% of the employee groups that produce 80% of the strategic value of your company.

Identify key work efforts. The next step in the methodology is to isolate 20% of the work efforts that these employee groups perform that are the critical issues for their success. Question them on these activities to test for the impact of a wide variety of OA technologies. The impact will either be tangible or intangible.

Identify impact. Tangible impacts should be captured in hours saved or improved. The before hours times payroll costs can be used to determine the old unit cost; the new hours, for the new unit costs. Employees should also be asked to rate the intangible aspects of the improvement in terms of quality, competitiveness and quality of work life. You can start with words like very high, high, medium, moderate and low; but you should convert these to 5, 4, 3, 2, 1 to be able to perform math on the ratings.

Present business benefits fast. Management will be most interested in the "war stories" involved with improving competitiveness, customer relations, timeliness of response and quality of services for those really critical work efforts you have zeroed in on. Your presentation should be on these improvements.

Present productivity benefits last. At the end of the presentation, you should have an exhibit that summarizes the tangible impact of each improvement on each group of employees. These productivity improvement dollars will be the icing on the cake for the presentation. If you have done your homework well, the business benefits from OA will sell the investment for you, and management will rest easy that many of your tangible savings will convert to greater profits and competitiveness.

≡

Shay is a manager in Peat Marwick's New York office specializing in white-collar quality and productivity. The 80/20 OA methodology for justifying OA was developed on a number of engagements.

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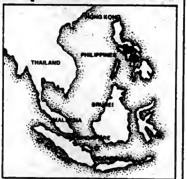

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The Hardware Reliability Problem: Who's In Charge?

By Bruce Poole

Hardware reliability is the single most important management factor in large-scale computer installations. Other considerations, although highly important, lose significance when machines are down or malfunctioning. Unfortunately, managing hardware reliability is not easy, even though the reliability of individual components continues to increase.

The cumulative effect of larger numbers of hardware and software components within the data center and network requires no less than superhuman efforts to meet the required levels of uninterrupted service. Few shops have the necessary in-house expertise. Even when that expertise is on staff, hardware vendors frown when users take things into their own hands and tear up the floor to get at cables or test and replace cards in suspect equipment.

This leaves us with an uncomfortable reality. Who's in charge here? The vendor. Hardware maintenance — and thus its reliability — is largely in the hands of hardware and third-party maintenance vendors.

The quality of maintenance provided by vendor organizations varies widely according to a number of factors: the vendor's attitude toward solving hardware problems, the attitude and abilities of maintenance engineers assigned to a site, the quality of management behind each representative and the user's attitude toward hardware problems.

One unhappy fact of hardware reliability is that user interests and vendor interests often conflict. The user wants the hardware to work as perfectly as possible with problems resolved quickly and minimal impact on production schedules. The vendor wants the same thing, but his orientation is quite different. He is less interested in the intimate internal workings of the client data center. He wants to keep the client happy, of course; invoices will therefore be paid on time, more equipment may be purchased and good references may result. But when corrective action for hardware failure is involved, it can be a very expensive proposition for the vendor — a nonnegotiable cost that can substantially reduce his profits. As a result, the vendor can't afford to comb the system for weaknesses and to respond in the data center's interest each time one is found. It's not in the vendor's best interest to volunteer, "It looks like volume 140 is getting too many temporary errors. Let me replace the HDA [head disk assembly] so you won't have a hard failure." The truth is, even when volume 140 hard-fails, the vendor is best served by finding a reasonable way to avoid replacing the HDA.

One approach the vendor can take is to talk away the problems. The vendor might call a given type of hardware problem normal and express the opinion that, in general, reliability on the site is excellent. Intermittent problems receive similar treatment. "Intermittent" comes to mean a normal deviation — nothing serious.

If peripheral units use removable media, the vendor may claim problems are due to media or environmental conditions, not the equipment. Although this argument sometimes has merit, it is often used as a blind.

Of all the arguments in support of system normalcy, availability statistics are the most effective. Discounting disaster circumstances, most large data centers can quote availability statistics of 99% and higher — an aggressive figure. What could be more positive to vendor and data center management alike than the knowledge that the system is available more than 99% of the time?

Unfortunately, availability figures can be misleading. For example, hardware failures that result in unplanned inital program loads (IPL) and network crashes don't have much impact on availability statistics. It doesn't take much time to get the system back up again, and the time it takes to make the system available again is a minor consideration. More important, however, is the question of how much it costs the organization to restart the work and to pay salaries of terminal operators left idle during downtime.

Other hardware failures don't bring the system down, but do cause one or more jobs to abort. Although the resulting reruns have no effect on availability statistics, their costs can be enormous.

What happens when failing peripherals units are varied off-line? The effect on availability is zero, but costs in dollars and time again occur. Still another problem shows up in the form of units that continually loop through retry and recovery from temporary errors..

In the name of maintenance, much is said, and the position — the user's hardware reliability is excellent — is supported in good faith. "You find what you are looking for," says an old adage. The vendor searching for evidence the system is healthy, evidence that's easily found because today's equipment is highly sophisticated and, indeed, works wonders. The user is satisfied because users want to hear the system is normal. Then disaster occurs. The vendor fixes the problem and everything is fine — until next time.

Users, recognizing the waste in the until-next-time attitude, are beginning to want to do what they can to manage their own resources. Tools that let the user get involved have been slow in coming. Most hardware devices relay a constant stream of log recording (Logrec) data that signals how things are going internally. A trained vendor representative can analyze this data to trace the source of a failure. Several available software packages collect this data in varying attempts to let the user become more involved, but these packages are still designed for maintenance engineers, not users. They address each problem on an individual basis and do not perform decision-making or problem-tracking functions. Most provide no comparative data for evaluating one data center against another.

Perhaps the greatest failing these tools have is that they provide their information after the fact. Whether because the raw data is difficult to analyze or because reports are available in batch mode only, the available tools can be used only after a failure, to dissect it in an attempt to find out what happened.

Implicit in the concept of management is the idea that information is gathered and, based on that information, decisions are made that will affect what is going to happen. Pulling together bits and pieces after a hardware crash is not managing the reliability. The ability to manage depends on getting information in advance.

What is needed is a system that reports Logrec information on-line in real time — capturing, analyzing and displaying IBM Logrec data as it happens. A tool of this sort will permit the operations staff to take action to prevent serious failure or to limit the impact in the event of serious failures that occur without warning. Operators should be able to take a closer look at problem spots by paging through the status of problem areas or specific units where problems are occurring. Component history should be saved so that batch reports can confirm system status or provide further analysis.

By capturing failure data in real time, operators know what is happening with their systems. When errors occur, they can see if they are inconsequential or if they signal trouble. Having this information changes the nature of the maintenance vendor relationship and dramatically reduces the time needed to allocate engineering activity. Vendor engineering work can be scheduled when it is necessary — when a problem appears — not on an arbitrary temporal basis. With each new wave of technology, vendors try to build higher reliability into their equipment in the design phase and in the factory. They are responding to the user need for reduced maintenance, but they have their own needs. Building a good machine, however complicated, is easier than exercising control over the abilities and attitudes of thousands of maintenance engineers out in the field.

Industrywide statistics show some firms are meeting with success. When users become more sensitive to this and start actually doing something about hardware failure, the built-in reliability enhancements engineered at the factory can finally pay off. Hardware failure will then be a problem to be addressed on a rational, timely basis, not an unpleasant and sometimes catastrophic fact of life.

* * *

Poole is director of marketing of Rescue/MVS, a hardware reliability tool, for California Software, Inc., in Sherman Oaks, Calif.

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FOCUS ON:
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A Close-Up Of Two Implementation Strategies

By Mary Karon Dash

There is a widespread belief among executives that the ills of the office can be cured through the introduction of technology. Many believe that problems such as high error rates, low productivity, high turnover, backlogs of work and customer complaints can be solved by the addition of equipment, a wave of the electronic wand.

The overlay of equipment or computer systems on areas experiencing operational problems can and most often does result in failure and disappointment. Anticipated results do not materialize, thereby creating morale problems and intensification of the original symptoms. Although forward thinking is essential to the efficiency and productivity of our offices, a prerequisite to change is that manual systems must be organized, efficient and effective. To superimpose technology on manual systems that do not meet the above criteria only makes matters worse.

The first requirement in introducing change is a smoothly operating manual system. If the present work force and manual systems are not prepared to incorporate and use the expanding technology, management's objective for improved productivity cannot be achieved.

The following case study illustrates the need to resolve operational problems before introducing changes.

Case Study 1

The customer service department of a financial institution traditionally had problems in getting work out and in retaining staff.

Because of the delays in responding to customers' initial requests and in updating or correcting their accounts, customers would write second or even third letters, adding to the backlog.

Management believed the problem was not one of staffing, but of inefficiencies in getting information entered into the appropriate computer system to update customers' records and inefficiencies in the letter production process. As a result, the firm installed a new system to enable customer service representatives to call up accounts for status, enter account changes, apply money or credits and even request the appropriate form letter to send to the customer. This system provided on-line validation, and management saw it as a marked improvement over the previous batch processing system. Processing delays resulting from the batching, editing and movement of source documents to the data entry unit were eliminated. It appeared to be an ideal solution.

However, management was in for some surprises. When the system was first installed, the department was on a current basis, but within nine months there were problems with throughput and backlog of work. The backlog persisted despite several attempts by the manager to reduce it. He scheduled the staff to work overtime on a regular basis and recruited staff from other departments to help in the evenings and on Saturdays. Each drive to cut backlog would be temporarily effective, but within a short period of time it would mount again. In addition, staff turnover (always high) remained a problem so that the department was comprised of relatively inexperienced staff, many still in training.

An examination of the operation, including charts of the work flow and critiques of each step in the process, showed that the source of the problems lay in the control and distribution of work, the methods for quality control and the training approach. Bottlenecks were designed into the work flow.

Compounding the weakness of the manual systems was the manager's work philosophy, which the staff characterized as authoritarian and overly controlling. This was apparent in the excessive number of logs and reports he instituted to monitor performance and accuracy; their maintenance created bottlenecks in the work flow. Even after installation of the new computer system, he continued to impose his earlier methods for training, controlling and distributing the work and maintaining quality checks. These methods remained exactly the same as they were before installation of the new computer system. Because the underlying causes of the backlog and turnover were not addressed, the problems persisted despite processing improvements realized with the new system.

If you are to manage change effectively, you must begin with the building of a logical model of the existing system. This logical model is developed by critical examination of current office operations. This means examining all aspects of each department including the nature of the work being performed by each person, the forms being used, the movement of work, standards that are being applied, exceptions and methods for handling them, timing requirements, equipment, identification of problems and so on. In sum, it means examining the department or the process in its entirety.

After the model of the current system has been built (that is, after the current work flow has been identified and charted), it is possible to critically evaluate the manual systems in each department. The key steps are to objectify the current operations, critique and question each step or aspect, propose and implement solutions to existing problems and then develop a new model of the improved work flow. The new model and the supporting documentation serve as a base from which management can determine what is needed technologically to perform the required functions and how to employ the equipment.

Armed with this knowledge, the manager can communicate more effectively with systems designers, office automation specialists and vendors and thus assure the equipment to be purchased will meet the company's operational requirements and offer the best return on investment.

Our premise is that you must begin from where you are; the essence of the new system is in the current system. If the decision makers in management examine current operations and processes and improve them before considering the addition of automated equipment or computer systems, they will obtain better results.

Case Study 2

A service firm's executives wished to evaluate their current and future OA requirements with particular attention to their text processing needs.

Equipment in the word processing center (WPC) required updating, so this was an opportune time not only to identify word processing requirements, but also to explore the possibilities of OA and examine available systems.

Major emphasis on the WP area arose from the professional staff's dissatisfaction with the performance of the WPC — specifically with getting material typed error-free and within specified deadlines.

If you are to manage change effectively, you must begin with the building of a logical model of the existing system. This model is developed by critical examination of current office operations.

The professionals generated a large volume of typed material such as proposals, reports and so on. They worked under time pressures and frequently had short lead times to get work out to the client. They also had heavy travel schedules and client commitments which kept them out of the office a great deal.

Management had consolidated their major typing functions into a centralized WPC which never really operated well.

The staff for the WPC came from an existing typing pool and the transfer of a number of secretaries from throughout the firm. The secretaries not assigned to the WPC were to provide administrative support to the professional staff. They were to restrict typing to documents less than five pages long and submit the remainder to the WPC. Management believed secretaries would only be spending an hour or two a day in typing.

Fifteen percent of the secretaries had typewriters with some memory; the remaining had standard typewriters. There was a proliferation of personal computers. The professional staff had access to two compatible types — one that was relatively portable for use on field trips and one stationary model for use in either the office or at home.

In addition to the dissatisfaction of the professional staff, the WPC itself had another problem — an extraordinarily high rate of turnover (85% in the previous year).

The equipment consisted of a shared logic system and a bank of stand-alone word processors inherited from the previous typing pool. The firm also had a mainframe that it used for billing, accounting and management reports. The firm occupied several floors of an office building.

The logical models were developed, and analysis of these models and the supporting documentation indicated the following:

- The need for localized WP capability at every secretarial workstation. The secretaries were typing an average of four hours a day instead of the expected one or two. More than half of their typing consisted of initial drafts that required two to three iterations having moderate to extensive revisions before final copy was produced.
- The need to expand the software support of the secretarial team to include mathematical functions, electronic mail, calendaring and a data processing interface.
- The need for a reduced centralized WP operation to meet some specialized production applications and to provide load balancing among the secretarial staff.
- The need to provide the professional staff with the capability to merge text, data and graphics.
- The need to link the personal computers to the mainframe and download files.
- The need to expand the use of the personal computer among the professional staff.
- The need to provide the secretarial staff with the capability of accessing text or other material keyboarded by the professionals for the subsequent draft to final copy process. Many of the professional staff were composing on personal computers and routing hard copy to the secretaries for further drafts or final copy. Because there was no compatibility of equipment, the practice resulted in an additional keyboarding.

For the short term, the firm elected to provide limited local WP capability to the secretarial workstations by moving the stand-alone word processors and staff from the WPC to strategic locations. Also, where possible, the firm would establish a team concept with a WP operator and secretary working in tandem to provide typing and administrative support to a group of professionals.

The firm also developed a program to improve the WPC operations. This plan addressed the turnover problem and practices such as the handling of rushes and corrections, scheduling methods, training approach and so on.

Management established an Information Center and developed a program to train the professional staff on the personal computers and the various software packages.

From analysis of the logical models, the firm was able to identify some of its initial requirements for a comprehensive OA system and develop a short-term strategy to meet some of those requirements.

However, the significant finding that emerged from the logical model was the need for communications control. And it was in this area that the major requirements for OA were specified. Communications control broadly includes the need to share or exchange information and is designed to handle the following:

- The need of professional staff members to be in contact with one another on an oral as well as written basis during and outside regular office hours.
- The need to determine availability of staff in order to schedule meetings with firm members and clients.
- The need to know the whereabouts of staff members in order to reach them to convey important messages or information — a tracking system.
- The need of professionals who travel to dictate by phone into a central unit and have their material transcribed and available when they return to the office or routed to others within the firm.

With these findings, management was able to specify additional capabilities that they were looking for in an OA system such as electronic mail, voice mail, calendaring, scheduling and electronic filing.

However, before the firm researched vendors for systems adaptable to its environment, management implemented the plans for improvement of the current operations and then developed a new model with supporting documentation.

Using the requirements list as a basis, management was able to intelligently research vendors and solicit proposals.

The next step was to develop a phased approach to implementing the OA system that management selected. With each phase, managers projected the impact on the organization and the changes in work procedures and job design.

However, examination of the office also includes a consideration of the workers. The involvement of the employees is essential to the introduction of any type of change, including change not related to automation. It is, after all, the persons doing the work who know it best; when their views are solicited, they can identify improvements and suggest how to simplify, how to eliminate the extraneous, how to reduce expenses and even how to do the same job with fewer people. The successful adoption of office technology must take the workers into account, and they must be involved in the planning for change.

It is clear that those affected by change must be involved in the planning and that it is best introduced in increments if we are to minimize the perceived threat and reduce resistance. And, as we have presented, a smoothly operating manual system is the reasonable basis from which to introduce change. Management should blend the needs of people and the organization with changes in the workplace, whether change involves new equipment, computer systems or manual methods. Positive acceptance and adoption of these changes requires planning and sustained effort throughout. To paraphrase Woodrow Wilson: A progressive office is not one that is ready to move, but one that knows where it is going when it does move.

◆

Dash is principal of Office Methods Ltd., a Chicago-based management consulting firm specializing in work flow analysis and the evaluation of office operations.

Micro Or Mainframe WP: Which Type To Use?

By Bart Carlson

An increasingly viable alternative to micro-based word processing is WP on mainframes.

There are two primary reasons for such a shift back to mainframe WP. First, many of the users in medium and large companies need to access large data bases that are usually resident on the mainframe computer. Second, a mainframe WP software package can provide WP on existing 3270 terminal equipment that is usually available and in many cases paid for, therefore providing a less costly alternative. This also eliminates the need to buy, inventory and manage the distribution of numerous copies of a given software package as is the case with micro software packages.

One advantage that micros have enjoyed is the tremendous array of fast and flexible office automation application products available such as spreadsheets, graphics, communications and WP. Mainframe users have simply not had access to comparable products.

Fortunately, software vendors are responding to this void by developing what use to be considered personal computer-type applications for mainframe systems. These programs are becoming faster, friendlier and more powerful.

Certain WP applications for correspondence, proposals, personalized mass mailings, sales letters, custom forms, donor acknowledgments, form letters, contracts and customer support responses lend themselves particularly well to mainframe systems.

Mainframe WP can best be utilized in industries such as banking, insurance, utilities, nonprofits, education, associations, health care and government — in fact, anywhere a large number of users share the same computer or have a large data base.

Mainframe WP solves many of the document distribution and retrieval problems inherent with micros. It allows the user to access the same data and text instantly, regardless if the user is located in an office across the hall or across the country. And depending on the type of software, the user can create a document on one terminal, print it on any printer on the system or send it to any other user's "in box."

Another major benefit of mainframe WP is security and control of data. From a data processing management point of view, access can more readily be controlled in the mainframe environment. For instance, if someone leaves the company, the systems administrator can immediately take away that individual's authority to access data. By contrast, on a micro, that same person could have easily made back-up diskettes and carried them out undetected in a briefcase.

Equally important is the security of data from system problems and natural disasters. Most companies with mainframes back up their disk files to tape every night. Many companies also arrange periodic off-site storage of these back-up tapes so that a major disaster (such as fire or flood) will not cripple the company. This is also a major benefit from the user's perspective because users do not have to worry about the tedious routine of daily diskette back-up. Even with the best of intentions, most micro users do not back up data on a regular basis.

A typical micro user perhaps has 400K bytes to 10M bytes of dedicated online storage available and has access to a letter-quality printer. Contrast this with the mainframe user who has access to massive amounts of storage and can share the use of several different types of printers such as high-speed band printers, laser printers, ink-jet printers, dot matrix printers and letter-quality printers.

Although the foregoing list of benefits presents a powerful case for mainframe-based WP, there are some disadvantages and some instances where micros would be the preferred method. One example occurs in companies that have branch offices distant from the mainframe computer. If there are no existing communication lines in place and no pressing requirement to share the same information on an interactive basis, then a micro may be the system of choice. In such companies, one or a small number of micros can quickly and relatively inexpensively be installed versus what may be the greater expense and time involved in installing communication lines.

Another situation where the mainframe might not be the preferred method is when the number of WP users on the system at any one time would degrade the system enough to slow response to other critical transaction-based production applications. These companies might have to switch to a larger mainframe or add the next increment of memory to support mainframe WP.

Many users may also be uncomfortable because their document access is always tied to the performance of the mainframe. Mainframe problems can shut down every terminal on the system, frustrating the average user who has absolutely no control over these types of problems.

Finally, although the best mainframe products are quite interactive, they sometimes do not give the user the immediate feedback of a micro. With micro WP, each keystroke of text entered is immediately sent to the CPU, and the document instantly appears updated or reformatted on the screen.

Most mainframe systems store entered multiple keystrokes of text in terminal memory, so the changes to your document are not permanently updated or reformatted until the operator presses a key to order the document updated on the mainframe. This is a plus in that the mainframe is not interrupted every time a keystroke of text is entered; therefore a large number of users will not degrade the system performance. On the minus side, the user does not always have an exact picture of what the document looks like.

Keeping the above pluses and minuses in mind, there is no magic formula to determine the advisability of installing mainframe WP at a particular company. Some experts believe, however, that many medium and large companies that have a large number of users would benefit from the centralization, control and shared access to data and text provided by mainframe WP.

In the 1960s, the earliest versions of mainframe text editors (such as TSO and Wylbur, which still exists as Super Wylbur) were introduced to the market. These products were born in university and research environments and were generally command-oriented systems whose primary function was to allow programmers to input and edit their program instructions. They were also generally limited to large OS-type environments.

Because they were developed for programmers, it was difficult to teach the average end user how to use these systems even if, in theory, you could produce the same document as on a stand-alone word processor. Secondly, there were significant limitations in document editing and formatting functions such as right margin justification, headers and footers, pitch selection, pagination and merging of text and data.

In the late 1970s and early 1980s, command-level mainframe WP systems such as ETC from Applied Data Research, Inc.; Bimtext from B I Moyle Associates, Inc.; and Qwik-Draft from Top Down Systems were introduced. These products provided users with many of the most desirable document formatting features, but were not considered as user friendly as the stand-alone word processors available at that time. This lack of

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The future also promises products that provide horizontal mainframe WP links to data bases, list management, personal computer-mainframe links, electronic mail, spreadsheets, graphics and other mainframe applications.

user friendliness was somewhat compensated for by the fact that these systems were sometimes customized for particular applications and performed these tasks well.

In 1984, other independent software companies such as Cincom Systems, Inc. and McCormack & Dodge Corp. announced embedded mainframe-based WP products. These products are embedded or integrated into their other application products, so they are not expected to represent a major thrust in the marketplace.

On October 25, 1984, IBM announced in a statement of direction that it is planning to release Displaywrite/370, its mainframe WP system for 370 architecture mainframes. IBM also indicated that Displaywrite/370 would emulate IBM's Displaywrite 3 micro software. Some OA experts predict Displaywrite/370 will operate in the VM/CMS environment, similar to Professional Office (Profs), IBM's electronic mail system, and possibly other environments as well. Since IBM's announcement, four other independent software companies have announced or preannounced entries into the mainframe WP marketplace.

In June 1985, Mega Group, Inc., of Irvine, Calif., announced Megaword, a mainframe WP product that enables users to move data from multiple spreadsheets into multiple documents. The Megaword product runs in VM/CMS and MVS/TSO environments. Mega Group said its product is aimed at managers who wish to retrieve data from a central computer, create models and write reports.

Group 1 Software, a division of Comnet Corp. of Washington, D.C., announced EZ-Word in August 1985. EZ-Word, which emulates IBM's Displaywrite, offers full-function WP and is completely menu-driven. EZ-Word can be used in conjunction with mainframe data files to create personalized correspondence with variable inserts on letter-quality or laser printers. This includes integration with a mail/merge and list management product called EZ-List. EZ-Word also features electronic document distribution so users can transfer documents to any other local or remote terminal or printer on the system. EZ-Word operates in CICS environments on all IBM or plug-compatible mainframes.

Word/3270 by Chicago Soft, Ltd., was introduced at the Information Center Conference. Word/3270 is a mainframe adaption of Micropro International's Wordstar software product for micros. Working on-line on a 3270 or compatible terminal, users can enter, edit and format text and save and print files. Word/3270 runs in VM/CMS environments on IBM or plug-compatible mainframes.

This past summer, Multimate International Corp. of Hartford, Conn., announced its intention to deliver a mainframe WP product by the end of 1985. However, shortly thereafter, Ashton-Tate announced its intent to purchase Multimate. Since that time, numerous conflicting stories have been reported in the press on whether Multimate is moving forward with their plans. This leaves the company's entry into this market open to some speculation.

With Group 1 and Chicago Soft products now available for shipment and IBM and Mega Group products in the advanced development stage, the mainframe WP market is about to expand rapidly. This is primarily true because of the user friendly functions these new products bring to mainframe terminals and the prominent role mainframe DP will play in the office of the future.

The future also promises products that provide horizontal mainframe WP links to data bases, list management, personal computer-mainframe links, electronic mail, spreadsheets, graphics and other mainframe applications. In fact, WP systems without a data base/mail merge interface will probably have little or no market.

Mainframe WP promises to be a dynamic and evolving market as users continue to demand new features and new links to other existing and new application products.

Carlson is vice-president, development, of Group 1 Software in Washington, D.C., a developer and marketer of OA, mailing management and postal discount software.

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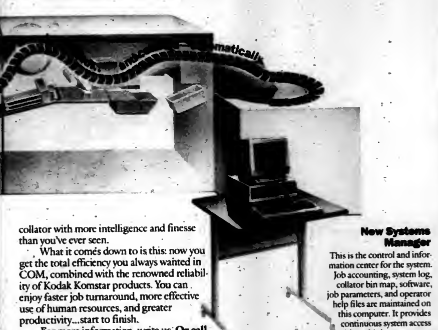

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Combining Voice And Data Through Local Nets And PBX

The controversy rages on between PBX and local nets. Either of these transport systems may be of benefit in combining voice and data depending on your specific installation needs. Every vendor seems to have a unique approach to implementing voice and data. Find out what vendors are offering to make these systems even more useful to you.

By Stuart Wecker

In the Aug. 28 issue of Computerworld Focus, *Wecker discussed some of the advantages and disadvantages of the PBX and the local-area network. In this month's article, he offers some pointers on vendor selection and current offerings.*

Each private branch exchange (PBX) vendor has a unique approach to the implementation of voice and data integration within the PBX architectures, within the wiring structure and within the integrated telephone sets. Some vendors digitize the voice information at the telephone set and multiplex the voice and data together onto a single digital path into the PBX. Other vendors use separate paths for voice and data from the telephone station to the PBX; the voice remains in analog form while the data is sent on a separate pair of wires in digital format and the wires are physically multiplexed within a single three or four twisted-pair jacket.

The key to the success of the integrated voice/data PBX is the integrated digital telephone set. This single instrument provides voice capabilities through a telephone handset, data capabilities through an attached RS-232C data interface and signaling capability through buttons and lights and an optional display on the instrument. This combined information, voice, data and control is sent to and from the instrument in digital form, multiplexed together on either one or two pairs of wire.

Currently all PBX vendors have proprietary architectures for the signaling between their digital telephone sets and the PBX. When you purchase a particular PBX, you must purchase the digital telephone sets from that vendor. In a typical example of multiplexed digital signaling, the instrument supports 64K bit/sec of voice as 8,000 samples of 8 bits each, up to 64K bit/sec of data in synchronous mode or 19.2K bit/sec in asynchronous mode and 16K bit/sec of control to manage the buttons, lights and display on the instrument. Examining the transmission link to and from the digital switch (ignoring framing bits) you would typically see groups of 8 bits of voice, 8 bits of data and 2 bits of control. This 18-bit group would be repeated 8,000 times each second, resulting in 64K bit/sec voice, 64K bit/sec of data and 16K bit/sec of control over this channel. Some PBX have the ability to increase this speed even further and to provide potentially up to 2M bit/sec of data at the instrument via a variety of interfaces.

In addition to their integration of voice and data, PBX offer a second major feature: network management capabilities. PBX offer extensive network management features as a result of both the maturity of their products and the importance of management, accounting and maintenance features in telephone-oriented applications. Among the PBX network management features are the following:

- **Accounting:** Detailed message recording of both off-site trunk calls and on-site conversations between stations attached to the PBX. This information can be used for charge-back or accounting purposes and for measuring the usage of the switching system.
- **Restriction and authorization:** Classes of service. Each user on the switch can have an individual station profile designating to which other stations or ports they can be connected. In addition, these profiles can be changed based on time of day. This allows, for example, certain systems to be accessed only by certain classes of users at designated times of the day and by other classes at other times. This adaptation can be used to provide load balancing and resource sharing of systems attached to the switch.
- **Maintenance:** Fault monitoring and diagnosis. PBX have extensive monitoring, diagnosis and reporting features. They are generally built as highly redundant systems meant to operate in a nonstop mode. When the PBX is not doing anything else, it is usually running diagnostics on internal components. PBX are usually built so that boards can be removed and replaced without powering the switch down.

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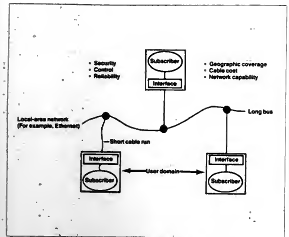

Figure 1. Local-Area Network Architecture

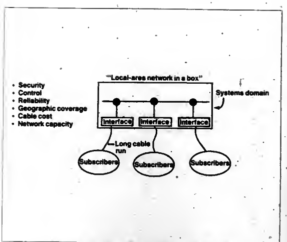

Figure 2. PBX With Local-Area Network Architecture

• **Security:** As a result of the technology of circuit switching and the architecture of PBX, circuits are dedicated between station users. Information is not broadcast among the users on the switch. Thus, security is an inherent part of PBX operation. In addition, more and more fiber-optic trunks are being used between modules of the switch, adding to the security in the system.

An initial examination of the star centralized topology of the PBX might lead one to believe that PBX structures have a potential single point of failure and are inherently unreliable. Generally, this is not the case. At a minimum, large PBX are built with redundant processors and memories. Newer architectures have adopted network structures via a loose coupling of multiple switching nodes. What appears to be a centralized PBX can be designed to be highly reliable via a logical distributed architecture.

For example, a bus-oriented distributed-switch can appear externally to be a centralized PBX with wiring attaching the instruments to the centralized switching unit. Internally, however, that switching unit is designed as a distributed switch consisting of many small processors, each supporting a group of attached instruments and communicating with each other over a shared bus. The system can be built in such a way that if one of the processors fails it affects only those users attached to the particular processing element, resulting in a highly available structure.

A close examination of present local-area network architectures and high availability distributed PBX architectures shows they are really quite similar. All that really differs are some of the dimensional parameters of the two structures (for example, see Figures 1 and 2). Figure 1 is the structure of a typical local-area network architecture consisting of an Ethernet cable with connected transceivers and short cable runs to interfaces and subscribers. Each interface operates independently, coordinating with the other interfaces using the carrier-sense multiple access (CSMA) arbitration scheme. The interface and subscriber are colocated in the user domain. Information is broadcast on the cable, received by all of the interfaces and accepted by those to whom the address matches.

In the PBX structure (see Figure 2), the dimension of the two cables has been changed. The local-area network cable has been shortened and put inside a box, the interfaces have been moved closer to the local-area network cable and the long cable run is now between the interfaces and the subscribers.

From a structure point of view, we have the same basic components, the same interconnectivity and the same reliability in the PBX and the local-area network architectures. The PBX architecture has the advantage that the interfaces and shared cable are within the system domain. The result is higher overall security; the only information sent to the subscriber on the long cable run is information for that subscriber, not information broadcast to all users in the network, as in the local-area network example.

In addition, control is simplified in the PBX because the interfaces can even be interconnected via a second local bus for this purpose. Cable cost can be lower in the PBX because the long cable runs are point-to-point terminated cables supporting reasonably high speeds while using inexpensive twisted-pair cabling. The PBX network capacity can also be significantly higher than a local-area network as the internal shared bus — local-area network in a box — can be a parallel bus of very high speed due to its short distance.

A comparison of PBX wiring and local-area network wiring also shows there is no major difference in the wiring requirements of the two systems. In both cases, wiring is from individual offices to wiring closets. In a PBX, the wire is then physically concentrated into trunks and brought to the PBX. In a local-area network, the network interface units are located in the closets and then connected into the major local-area network cable. In both cases, the bulk of the wiring is from the offices to the wiring closets.

The capacity and bandwidth usage of voice and data on a PBX are important considerations for those planning the size and capacity of a total integrated voice and data system. Voice has the characteristic of a continuous bit stream of 64K bit/sec, specifically 8,000 samples of 8 bits each per second. It is, however, of generally low call duration, on the order of a few minutes. A standard busy office telephone is assumed to have a connected time of approximately 8% to 16% per hour. Thus, a switch with 500 connected instruments could probably get by with an internal circuit capacity of 100 pathways.

Data has just the opposite characteris-

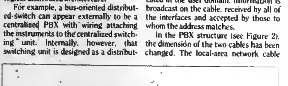

Figure 3. Alternative Topology

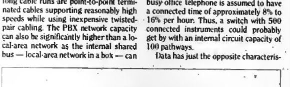

Figure 4. Alternative Topology

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tic compared with voice. It consists of bursty blocks of transmission, particularly terminal-to-host traffic, usually averaging less than 1,000 bit/sec, significantly less than the voice transmission speed requirement. Data, however, has a high call duration, on the order of hours. Users typically connect their terminals to their host computers and remain connected for long periods of time. The connected busy time in many cases approaches 100% per hour. Thus, a system with 500 terminals trying to connect to host computer ports would not present acceptable connectivity if the switch internal capacity offered only 100 pathways. In this environment, a switch with a capability for 500 simultaneous connector paths would probably be required to satisfy the data requirements.

PBX vendors refer to the capacity characteristics of their switch using the term blocking. Blocking is the probability that a call request will be rejected. Unfortunately, each vendor defines blocking in a way that emphasizes the advantages of the particular product. For example, the following are three possible definitions of blocking:

- The call request was rejected because the switch had no more capacity for call circuit connections.
- The call request was rejected because multiplexing paths within the switch have no more capacity.
- The call request was rejected because the expected duty cycle or usage level specified by the vendor was exceeded.

Clearly, the best of the three definitions is the first, where users cannot build any more paths through the switch because the capacity of the switch is fully utilized. The second definition says that the capacity of some level of internal traffic multiplexing between the port interfaces and the switch has been used up. There still may be internal switch capacity, but it is not available to the requesting users. The third definition, also the weakest, states that the switch will not block as long as it is not overutilized. Using this definition, heavy data usage will usually result in unacceptable performance of the switching system.

Vendors have employed various techniques to achieve better data capacity and bandwidth usage for data not requiring the full 64K bit/sec paths, as for terminal-oriented traffic. If the switch has enough total capacity in 64K bit/sec paths to support the attached users, the bandwidth may simply be wasted with no adverse effects. If the switch does not have enough total capacity, the 64K bit/sec paths may be submultiplexed. That is, a 64K bit/sec path can be subdivided into some number of equal capacity subpaths (for example, eight 8K bit/sec paths from one 64K bit/sec path, handling 8 data terminals within a single voice capacity pathway). Other vendors packet switch a 64K bit/sec path dynamically among many terminals and share it on an as-needed basis.

There are many issues that have to be considered in the evaluation and selection of PBX. Clearly, in each environment and for each user priorities differ. The following is a brief list of some issues that should be considered in such an evaluation:

- Architecture and topology.
- Function and switch capacity.
- Availability and reliability considerations.
- Data interfaces and network services.
- Network management sophistication.
- Voice and data performance tradeoffs.
- System and user station features.
- Service and maintenance.
- Physical characteristics.
- Wiring plant.
- Vendor reputation.
- Price.

Price is generally the last consideration to be applied, for two reasons. First, a PBX will not be useful unless it meets its set of technical characteristics; second, because of the competitive nature of the PBX industry, systems with similar function characteristics won't have large differences in price.

There are many vendors in the voice/data PBX business. The major established vendors selling large switches in the 5,000- to 10,000-line size today are AT&T Information Systems, Inc. (System 85); Northern Telecom, Inc. (SL-1);

Price is generally the last consideration. First, a PBX will not be useful unless it meets its set of technical characteristics; second, systems with similar function characteristics won't have large price differences.

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IBM/Rolm Corp. (CBX); Intecom, Inc. (IBX); Ericcson Information Systems (MD110); and NEC Telephones, Inc. (Neax 2400). In addition, many other vendors are in the voice/data PBX business with either newly announced switches or with switches of smaller size including companies such as Telenova, Inc.; Ztel, Inc.; CXC; Harris Corp.; and Siemens Corp.

> **Through these gateways it is possible to get the best of both the local-area network and PBX worlds — to use each communication technology where it makes sense from both economic and requirements considerations.**

The architectures of these switches vary from completely centralized to highly distributed, but fall into three basic types.

The first is a centralized architecture — a single centralized switch with the interface units being remoted to user locations, reducing the user-to-interface wiring. The Intecom switch is an example of this architecture.

A second basic architecture is a distributed architecture consisting of an independent stand-alone PBX with a shared switch used to interconnect these independent PBX when required. This is the architecture of Ericcson and AT&T.

A third type of architecture is also a set of stand-alone PBX, but without a central switch. In this configuration, the individual PBX are connected in a mesh fashion. This is the architecture of IBM/Rolm and Northern Telecom.

To determine which particular architecture and switch characteristics are most applicable to a specific environment, an evaluation of each user's requirements, physical topology and performance trade-offs must be made.

Local-area networks can be interfaced to PBX through the network interfaces described earlier. These high-performance and high-function interfaces attach to the PBX switch and act as gateways connecting external networks to the internal PBX switch architecture. The most common interface gateways available today are those for Ethernet and X.25. Through these gateways it is possible to get the best of both the local-area network and PBX worlds — to use each communication technology where it makes sense from both economic and requirements considerations. Local-area networks can connect computer systems to each other and to the switch via a high-speed interface, and the PBX can be used directly to interface lower speed personal computers and terminal users. Local-area networks can also be used to provide trunking between distributed PBX systems.

Figures 3 and 4, Page 46 show two possible alternative interconnections: Figure 3 with workstations connected directly to a local-area network and the local-area network interfaced to the PBX and Figure 4 with the local-area network serving as a PBX interconnect structure.

Communications networks must meet the most restrictive service requirements of their users. An examination of the requirements of voice and data shows voice to have the more difficult set of requirements to satisfy. Integrating data into a digital voice PBX architecture is a fairly straightforward task, which makes the integrated voice/data PBX an ideal hub for a total communications system.

Wiring cost and maintenance are major cost components of a communications system. By integrating voice and data within a single system, both of these cost components should be reduced to the cost of the wiring and maintenance of a single switching network. Sharing the communications system for voice and data is a good economic choice if both voice and data capabilities are needed. If data is the only requirement, this integration may not be justified and a data-only PBX or local-area network may be a good alternative. In addition, taking this integration step prepares you for the eventual interconnection to the international voice/data network (ISDN).

The next few years will mark an evolution for the voice/data PBX industry. There will be more network interfaces and data communication capabilities available from PBX vendors as they implement their plans to make PBX the hub of the voice and data communications system.

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Wecker is president, Technology Concepts, Inc., a firm specializing in network consulting and implementation in Sudbury, Mass.

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End-User Computing Is Transparent At Corning Glass

Corning has been encouraging end-user computing since 1979. Today, 50% of its employees use computers. Management figures they're halfway home.

Dennis Lockard, manager of End User Support Services at Corning Glass Works, must have felt like a pioneer in 1979. As head of the business analysis function within the applications development department, he agreed to look into "this personal computing stuff."

Today, Corning Glass Works, which employs approximately 7,000 people at its Corning, N.Y., headquarters location, has 500 personal computers. This year alone, 15 trainers will teach more than 1,500 people in various courses ranging from introduction to personal computing to mainframe applications. The information center, a term the crew at Corning feels it has outgrown, has spread beyond the southern tier of New York to its other manufacturing facilities and regional offices in the U.S. Soon the road show will travel to South America, Europe and Asia.

A good part of Corning's growth in end-user computing was an evolutionary process. But the goodwill spread by the training team; the behind-the-scenes support of Lockard; the visibility of computing at the highest level in the company (James R. Houghton, chairman, makes sure all pictures taken of him in his office include his personal computer); and the master plan of the newly arrived vice-president, Information Systems Division, appear to be working very much in concert to make end-user computing something much more than an end in itself.

It wasn't really too traumatic at the beginning, Lockard said. At the initial presentation there were those in the data processing department who were alarmed

By Lee White

that an alternative to traditional DP was being set up. The resistance lasted, according to Lockard, exactly one-half day. "We became conscious of how we presented ourselves." Once the DP people realized the information center staff would be relieving them of duties that had kept them from doing "big exciting data processing stuff, one at a time they all lined up behind us," Lockard said.

Once the DP people realized the information center staff would be relieving them of duties that had kept them from doing "big exciting data processing stuff, one at a time they all lined up behind us," Lockard said.

Lockard knew creative hiring would be the key to good staffing for his information center. The first person he hired was a woman who had begun a users' group to solve problems to which the DP group was unresponsive. Lockard had sat in on one of the meetings she was conducting and vowed the first chance he got, he would hire her. Because she worked out so well in the information center, he formed a philosophy to hire the person who is successfully working in another department.

According to Lockard, this has proved a good philosophy for two reasons: a person who is in demand is going to work well with people and information center staffers need a career path.

The present information center staff supports Lockard's premise. Floyd McWilliams, who supervises the staff, came to Corning just over a year ago from Harris Corp. He had years of experience in traditional mainframe DP, including positions with the New York State Department of Education, University of Denver and General Electric Co.

What could possibly convince a dyed-in-the-wool mainframer to take a job supervising a staff concerned primarily with teaching the use of personal computers? "I've got a very strong feeling that in five years, programmers — as we've come to know and love them — are going to be gone, at least in most places. I wanted to get away from that mainframe centralized focus, yet still work with computers and people," McWilliams explained.

While at Harris, McWilliams did a lot of training, mostly in mainframe tools and word processing. Acceptance of his work was difficult to overcome on three levels. The people he was training were originally resistant to change, but soon accepted and then loved the new technology. Management acceptance was spotty, but when they saw the benefits they tended to see it in terms of cost savings. Most difficult to overcome was the resistance from his cohorts in the DP department. "I was persona non grata by the end of the time I was there, as far as my colleagues went," McWilliams said.

McWilliams was most impressed that Corning committed a great deal of money and resources to its training center — a large, brightly lit classroom with 10 personal computers. He inherited one team of trainers and soon created a second one. The first team, which everyone calls the A-Team, is comprised of three analysts — Jill Hurst, Gary Pease and Terese Ruocco. Hurst has an undergraduate degree in philosophy and a master's in library science; Pease's undergraduate work was in marketing, he has a master's degree in business administration and once sold mainframe computers; Ruocco has a two-year secretarial degree, a two-year chemical technology degree and should complete her bachelor's degree in general studies in about a year.

The second team, which no one calls the B-Team, is peopled by Randy Pruden (master's in business administration), Don Schwartz (whose background is in mechanical engineering), Debby Whitson (with secretarial school background) and Linda Smith (a systems analyst).

It is these teams to which the bulk of the teaching, training, consulting and help-desk work falls. And it is because of the teaching, training, consulting and help-desk work that Lockard has never hired anyone from within the confines of Corning's own DP department.

In the beginning, when the information center resided on The Hill with the data center (End User Support Services is now located three miles away at the corporate headquarters building), nobody wanted to be in the information center. The general feeling was it wasn't real DP, according to Lockard, but slowly the attitude changed. "We were having fun, and one at a time [DP] people came to me and said, 'Gee, can I talk to you?' and I said, 'Sure, let's talk.' "

Lockard estimates he has interviewed 30% of the applications development

staff. Yet none, by mutual consent, has ever moved into the information center.

This will change in early 1986 when the first person from DP moves into the end-user function. "There are about 195 people in the division, about 100 exempt people, so we'll have hired 1%. There really is a difference between the people, but the key is to allow them the option of moving in. It's all right to create country clubs as long as you give everybody the option to join," Lockard said.

But the work being done by the end user support services teams should be compared to that done by the country club workers rather than the country club members. Training 1,500 people on- and off-site, in addition to project work, software evaluation and long stints on the help line cannot really be called fun, although none of the team members expressed any desire to leave the department for greener pastures.

One of the highlights for the A-Team was the training project at Siecor Optical Cables, Inc. in Hickory, N.C., which is owned jointly by Corning Glass Works and Siemens Corp. Siecor wanted an information center, but had no idea how to begin one.

Originally, the plans were to train 80 people, a number that grew quickly. Because Siecor had no on-site location suitable for such training, they arranged space at the local community college. In all, the training lasted six weeks and included courses such as introduction to personal computers, beginning Lotus 1-2-3 (Lotus Development Corp.) and advanced Lotus 1-2-3. They now have their own information center; the manager of that center used to run a travel agency, owned a hammock company and has a master's in business administration.

> **The rationale behind all heavy-duty training done at Corning headquarters and its far-flung offices and subsidiaries is twofold: establish standardization within the company and make each group, division and company capable of operating independently.**

The rationale behind all of the heavy-duty training done at Corning headquarters and its far-flung offices and subsidiaries is twofold: establish standardization within the company and make each group, division and company capable of operating independently.

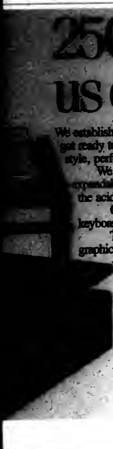
The issue of standardization has not been difficult for Lockard and his group. The desktop computers are all IBM Personal Computers or Personal Computer XTs. The portables are Compaq Computer Corp.'s Compaq. The primary software packages are Lotus' 1-2-3, Multimate International Corp.'s Multimate or IBM's Displaywrite 3; for presentation graphics, Decision Resources, Inc.'s Chart-Master and Sign-Master.

While Schwartz expressed concern that the training staff did not have time to evaluate all the new products, it was obvious that Corning operates on a need-to-have basis: If they need to have it, they'll go look for it.

The independence of each operating group within Corning was demonstrated by the young start-up information centers around the company. Mike Slovak, who ran the information center at corporate headquarters prior to Floyd McWilliams, has moved on to the Fallbrook plant at Corning, where he's doing it all over again. At the present time, Slovak has two people reporting to him and has just opened a WP center. When Slovak arrived at Fallbrook, there were two personal computers and eight terminals hooked to an IBM 8100. They have just purchased a Digital Equipment Corp. VAX 785, and Slovak anticipates by June 1986, 30 terminals will access the VAX, 10 of which will be personal computers that can act in the stand-alone mode. Slovak has also ordered an IBM Personal Computer AT, one of the few at Corning.

In another offshoot, Duane Welch, project manager in planning and business development, serves as the expert in his group. Although never formally trained in computer science, Welch has always liked math and found computers a natural outlet. Part of the original users' group back in the days at Corning when end-user computing consisted primarily of IBM's A Departmental Reporting System (ADRS) on the mainframe, Welch likes to think of himself as one of many people at Corning who serve as catalysts in computing.

He misses the formal users' group meetings, speaking wistfully of the days when people got together to share the little tricks they'd discovered noodling around the keyboard, but realizes the formality of today is better in the long run. "Now [end-user computing] is mushrooming, and I guess that's what you really want it to do," Welch said.



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However, Welch was quick to point out that responsiveness from Lockard's group was not a problem. When Lotus Development Corp. announced Symphony, Welch was one of several people who was asked by Lockard's group to take a look at the product.

His opinion and the opinions of others looking at Symphony were that the product would not be a good choice for Corning.

"My feeling was that [Symphony] and the manual were written by and for a bunch of computer jocks spending a weekend at Malibu Beach and saying, 'What can we do that's fun for the weekend?' " Welch joked.

What kind of company does it take to see to fruition the kind of computing power that more than 50% of the working population at Corning now uses?

Janet McLaughlin, manager, Office Systems Consulting Group, gives a great deal of credit to David Luther, vice-president, who recognized that although technology was a key to improved productivity, technology couldn't be separated from people issues. It was he, McLaughlin said, who moved her group from its home in the personnel department into the Information Systems Division.

The mission of the Office Systems Consulting Group is to implement Corning's mission: Know what needs to be done, have the tools to do it, then do it right the first time. Often, according to McLaughlin, a department or work group sees the new technology as the only tool necessary to increase productivity. McLaughlin and her staff actually study the department, interview members, chart work flow and come up with recommendations.

An even more important measure of success at Corning is called total chargeback. In the early days of information centers, little money or human resources were expended because no one was really sure end-user computing would be much more than a fad. But times have certainly changed.

Sometimes the answer is more computerization; often it is much more than that. A total analysis can take from nine months to two years.

The success of McLaughlin's program can be attested to by the fact that there is a waiting list for the Office Systems Consulting Group's services. And the success of End User Support Services can easily be measured by the number of satisfied end users. But there is an even more important measure of success at Corning: it's called total chargeback.

In the early days of information centers, little money or human resources were expended because no one was really sure end-user computing would be much more than a fad. But times have certainly changed.

According to The 1985 American Management Association Report on Information Centers, close to 90% of surveyed companies purchased personal computers in 1984, and of that 90%, half purchased between 11 and 100 of the boxes. The average number of full-time information center staff members in the surveyed companies in 1984 was 5.4; the average anticipated increase for 1985 was 1.86.

At Corning, the foresight that put in place an information center in 1979 must have also played a role in the decision to implement chargeback. Although a telephone call to the help desk doesn't cost the caller anything and the time the trainers spend evaluating new software and advanced applications and training techniques has no price tag attached, just about everything else does.

Training and consulting at Corning headquarters costs $40 per hour per person; the road show is $400 per person per day plus expenses. The Office Systems Consulting Group charges $350 per day, "and that's a bargain," McLaughlin said.

How does a department or division or group know more than a year ahead whether to budget money for such expenditures? And if they find they need some training or another personal computer along about March, are they out of luck until January of the next year?

Corning seems to have an answer for just about anything, including the unanticipated line item expense.

Upper management at Corning requires its managers be responsible for only a bottom-line budget. If a manager thinks the purchase of a personal computer is important, then that manager might put off a new hire for a couple of months or borrow from some other part of his budget, as long as the bottom line at the end of the year comes out right.

As one manager phrased it, "If you don't have authority over your own budget, then you're really not a manager, are you?"

And management is the key to everything at Corning — even to managing its environment. Two years ago, Corning Enterprises was formed as a wholly owned subsidiary of Corning Glass Works.

One of its main objectives, according to Hank Milledge, controller, was to secure new jobs in the area by bringing in new companies, helping to start new companies and funding venture capital activities. Corning Enterprises owns Corning Hilton Hotel, Watkins Glen Raceway, Elmira Aeronautical Group and Wine Market, Inc. that sells wines from 19 different vineyards in the area.

Milledge even serves as a financial adviser to those who might be interested in starting a business in Corning. Often people will come to him with an idea and some figures.

Milledge uses his personal computer to help them turn theories into workable plans. But this is one place where the chargeback mode doesn't come into play. "We do that sort of thing as a service, specifically to help a business get started and employ people," Milledge explained. It isn't only altruism, however, that spurs the good work of Milledge's group. Providing this sort of service in order to make a healthy, thriving town helps to attract good people from the big cities to the little community of Corning (population 17,000).

The most recent of the big city transplants is Harvey Shrednick, vice-president, Information Systems Division. Coming from a position as senior director, Information Management Systems at Nabisco Brands in New York City, Shrednick saw the challenge of adding the one piece of end-user computing that seemed to be lacking: mainframe-based information center tools that could be accessed by the huge installed base of terminals and personal computers. "Personal computing at Corning has whetted the appetites of the users. Now they want more," Shrednick said.

For Corning's users, the definition of more will start with an IBM 3033 operating under VM where Information Builders, Inc.'s fourth-generation language Focus and IBM's Professional Office System (Profs) will be running within months.

Shrednick, who recently presided over a reorganization of his 200-plus person department, sees himself as a conductor who will orchestrate the balance between mainframe and microcomputer.

Lockard, on the other hand, might see himself as the concertmaster when he brings together his end user computing group with the techies on The Hill.

Does Lockard anticipate problems? None at all, he said.

"There's a technical guy over at the data center named Jim Scott. He and I have differing objectives, but we both know what the overall mission is and we have an agreement: Jim makes it run, and I make it work.

"If I can help, I will, and if he can help, he will. We're both going to own the overall objective." Lockard said.

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White is a senior writer at Computerworld Focus.

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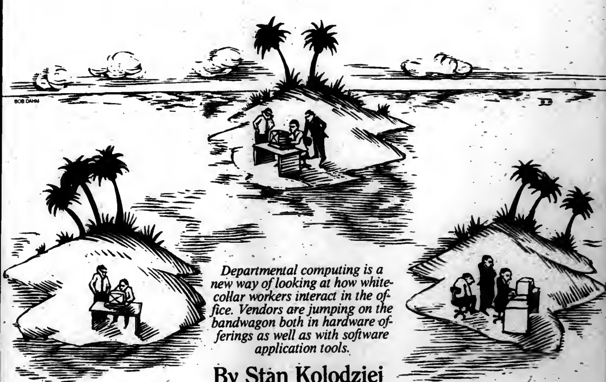
Departmental Computing



Departmental computing is a new way of looking at how white-collar workers interact in the office. Vendors are jumping on the bandwagon both in hardware offerings as well as with software application tools.

By Stan Kolodziej

Departmental computing may be a new buzz word, but the idea is really an outgrowth of distributed processing. What makes departmental computing different is its concentration on work groups, those clusters of corporate workers ranging from five to 50 in number, who share a common work area, common business goals and more often than not the same type of information.

These work groups are not necessarily in the same office, but rather are linked by the need for strong, daily interaction. A group could be sales people sharing the same regional territory and products, an accounting group within a corporate division or a group of engineers working on the same project.

"Departmental computing focuses on knowledge workers," Tim Williams, senior analyst at Future Computing, Inc., a market research firm in Richardson, Texas, explained.

In the past, vendors of vertical software have targeted these work groups, which were frequently regarded as a market too specialized to be profitable enough for the large hardware vendors. But now that the computer market in general has tightened, hardware vendors are scouring the market for third party software houses to create vertical application software for their systems and departmental customers. Other vendors are providing fourth-generation software application tools for departmental users (usually through the management information systems group) to help them create their own application software.

Interestingly enough, MIS departments are proving to be a big mover in the demand for these software application tools, often as a way to help relieve their backlogs of user application requests.

"Users might be vocal, but many are now having to channel their demands through MIS. MIS is becoming a bigger influence in departmental computing," Roger Bailey, senior director of systems marketing at Motorola Information Systems, Inc., Cupertino, Calif., noted.

Bailey sees the surge in departmental computing as stemming from a reaction to the corporate personal computer buying sprees of past years. "MIS has been assigned or taken on the task of organizing what has often been a mess in corporate personal computing," he explained. "MIS is trying to gain control again and better organize individual computing through a work group approach."

"The [IBM] PC has become a pervasive element, and there has been some dragging of feet on the part of users as to where these machines come into play in the office scheme of things," explained Carl Machover, president of consulting firm Machover Associates Corp., White Plains, N.Y. "Departmental computing is a framework with which to integrate these workstations and help reverse the fragmentation of data bases," Machover said.

Data General Corp. of Westboro, Mass., is one of the vendors marketing the idea of departmental computing. J. David Lyons, vice-president and general manager for the information systems division at DG, said in a recent speech, "Departmental computing is the linking of personal systems to corporate systems with a third tier of processing power. It is a direct result of the organizational tension created when centralized mainframes meet proliferating personal computers." Lyons concluded by saying, "These two opposing organizational tiers have traditionally used processing methods that don't lend themselves to easy integration."

Most computer vendors seem in general agreement with Lyons' definition of departmental computing. Kirby Herron, senior director of strategic product planning for Datapoint Corp. in San Antonio, Texas, puts the maximum number in a group at 30 and says that 50% to 60% of the information used by any one department originates in that same department.

Vendors are taking departmental computing and selling it to users according to their respective backgrounds of expertise.

Digital Equipment Corp. of Maynard, Mass., has played the game a long time. DEC's All-In-1 integrated office software is geared specifically for departmental computing, according to the company, and since DEC's recent integration of its Microvax II family of computers with All-In-1, DEC has solidified its position as a leading departmental computing supplier. In fact, International Data Corp.(IDC), a research firm in Framingham, Mass., estimated All-In-1 represented almost 33% of all integrated office systems shipped in the U.S. in 1984.

DEC seems to approach departmental computing as an exercise in chemical warfare. "We break a company into components and articulate its business problems at various levels and at different departments. We then isolate a work group and concentrate on it." Dick Loveland, manager of product planning for office and information systems at DEC, said.

DEC is one of those few vendors that can give its customers many hardware options for departmental computing. Loveland said All-In-1 can isolate the work group from other work groups while using a Microvax as a file and application server. It can connect other work groups with electronic mail, tie in IBM Personal Computers or connect with the Decnet local-area network to go corporatewide and share data bases and files. It can work in clusters of VAX minicomputers in several different configurations.

IBM offers the same sort of hardware flexibility. IBM corporate sanction has made the company's System/36 computer its main thrust into departmental computing. IBM's approach is also just as structured as DEC's. (IBM, to begin with, slots every user within one of its six well-known categories of users ranging from secretarial to engineering/scientific.)

Bob Murphy, division director, general and office systems, product line planning and national accounts division at IBM, offered a parable to illustrate departmental computing. "On the first day," Murphy explained, "users will install their PCs and solution their own problems. On the second day, they're walking down the aisles with diskettes to share information with people in their departments. On the third day, they want to send the diskettes outside the department or outside the company altogether." The moral, Murphy intimated, was to make sure you can provide users with what they can't immediately foresee.

Murphy said IBM has recently changed marketing schemes and is adopting a four-level strategy in departmental computing. The first option is a series of IBM Personal Computers and terminals attached to a System/36 computer and running IBM's Personal Services document distribution and Displaywrite software. The second model has an IBM 370 running in a Distributed Office Support Systems (Disoss) environment with the Personal Services software connecting IBM PCs with the system. The third approach has VM Professional Office Systems (Profs) emphasizing electronic mail and document exchange and again tying in IBM PCs. The last method is the IBM PC Network, a system that has recently been criticized for lack of power, but in which IBM still says it has the utmost faith as an important departmental computing vehicle.

It's clear from what Murphy said that IBM is making sure its PCs are now playing a big role in its departmental computing strategy. The glue tying everything together seems to be the Displaywrite and Personal Services software. Departmental computing is also proving of great benefit for minicomputer sales, making the minicomputer industry one of the few areas enjoying current computer sales success, according to Richard Mikita, IDC analyst.

Minicomputers using 32-bit processors are fast and powerful enough to act as departmental file and application servers for up to 100 workstations while also acting as a communications gateway for users needing to access data beyond the department level. Minicomputers can also provide individual users with virtual storage capacity and increased memory for applications requiring more than a personal computer could handle. Users are seeing the benefits of minicomputers in departmental computing. Research from IDC indicates that U.S. shipments of minicomputers in the 17 to 128 user category will enjoy a compound growth rate of almost 13%, compared with 10% for the computer industry as a whole.

Additional competition for mainframe and minicomputer vendors in departmental computing has come from multiuser systems vendors such as Altos Computer Systems, Inc. and Convergent Technologies, Inc., both located in San Jose, Calif. Multiuser systems came into departmental computing behind the larger systems vendors, providing 16-bit (several years ago, Altos even started selling 8-bit servers for work groups) processors and catering to the needs of clientele who had neither the need nor the funds for the departmental computing power that the likes of DG, Datapoint, IBM and DEC were offering.

Beyond computer hardware there is the continuing movement underway to provide software application tools and training programs to departmental users.

Convergent Technologies, a vendor of multiuser systems for original equipment manufacturers, offers a good example of the type of concentrated computing power that multiuser systems vendors market. Convergent Technologies recently introduced its series 286 Ngen processor, based on the Intel 80286 microprocessor, and offering a full 8 MHz speed, 1M byte of main memory expandable to 4M bytes, 4M bytes of main memory for each workstation and RS-422 ports for data exchange speeds up to 1.8M bit/sec. Convergent Technologies also just introduced its Mightyframe, a 32-bit supermicro computer capable of feeding 42 terminals and handling main memory up to 16M bytes.

"I think it's evident that these machines are produced to do more than just spreadsheets," Nate Brookwood, director of product marketing strategy at Convergent Technologies, explained.

"The fastest growing segment for computer systems is the $6,000 to $25,000 range," said Phil White, Altos senior vice-president, who claimed revenues in this area of multiuser systems are rising at better than 30%. "Departments want the number crunching up front."

If they do, they will have to pay for it. For heavy transaction processing within departments involving up to 30 people, dedicated multiuser systems are considered more suitable than local-area networks linking personal computers to a file server, minicomputer or mainframe. The per user costs are also initially higher. According to Omri Serlin, president of ttom International Co., a Los Angeles, Calif., consulting firm, "Most dedicated work group systems contain an overhead that is meant to be amortized over a number of years."

Multiuser systems are generally more cost-effective the more users are on the system. If the system has a capacity of 20 users and only 12 are currently on-line, there is disk space and CPU power going to waste, which can be translated into lost productivity. Once the system reaches its intended capacity, however, it can be expensive, even cost prohibitive, to add more disk space and processing power, perhaps even another processor to the system. Unless the multiuser system is overmatched for a departmental computing task, it can be expected to be more economical in absolute cost than networking PCs. "It's not enough anymore to give a lot of processing to individual users," Brookwood explained. "You have to have networking to share data. Users are expecting these things from one vendor now."

Multiuser companies have apparently gotten the word. These vendors have always stressed quick data access and exchange within work groups, but increasing market pressure from local net vendors such as 3Com Corp. of Mountain View, Calif., and Novell, Inc. of Orem, Utah, is making multiuser systems vendors include networking in their product offerings (if not a full-blown network, at least gateways to such popular network architectures as Ethernet and Decnet).

Although Altos has recently introduced its Worknet high-speed data network and Convergent Technologies has just come out with its own Ethernet gateway link, some analysts, nonetheless, play down the departmental incursions of network companies. "There is simply not enough power and allocation of resources available on micro networks," Joan McKay, analyst at Kidder Peabody & Co., a Boston, Mass., consulting firm, said.

Most observers agree that if the work group emphasis is on individual tasks such as spreadsheets and word processing with little requirement to access more regional or corporate data bases, then a low-speed micro network is fine. For high-speed data transmission, there are higher capacity networks available from 3Com and Ungermann-Bass, Inc., Santa Clara, Calif. Because these are still micro-based, however, some detractors point to their limited processing and storage capabilities, instead recommending networks that use minicomputers.

A big advantage of multiuser systems, however, is the handling of larger data processing tasks through the temporary cancelling of service to some or all of the users. It's impossible to do this with workstations or PCs connected over a local-area network.

Despite some drawbacks, local-area networks are often preferred over multiuser systems when low initial installation costs are a big factor or electronic mail is a major consideration. Local-area networks cannot usually provide as efficient electronic mail as a multiuser system using a centralized computer, although Bill Krause, president of 3Com, said this is becoming less of a factor with improvements in network servers.

A large part of the product expansion strategy of vendors of departmental computing systems involves voice. Datapoint, one of the first companies to apply minicomputers as file and application servers and local-area networks to departmental computing, is trying to regain market respectability with Minx, a workstation integrating voice and video messaging. "Minx is aimed at work groups where high degrees of personal interaction are required," Herron explained.

Voice Processor from Convergent Technologies has the ability to embed voice messages into documents, a feature, according to Brookwood, "appealing to the growing number of departmental professionals who are sharing secretaries and equating economy with improving productivity."

DG is slating its D555 voice/data workstation to be a key part of their Comprehensive Electronic Office (CEO) computing environment.

Beyond computer hardware there is the continuing movement underway to provide software application tools and training programs to departmental users.

At Monsanto Polymer Products Co. in Saint Louis, Mo., for example, a consortium of the MIS department, sales personnel and some supervision from DEC support staff, used application tools within DEC's All-In-1 architecture to produce continually updated sales reports application software on a DEC VAX 780 minicomputer. According to Russ Sprague, director of commercial information systems at Monsanto, sales personnel use DEC VT 220 terminals at their homes to key in and access the updated sales data pertaining to their sales areas.

Sprague described the system as "highly menu-driven, requiring only a few keystrokes." Brought about as an experiment to circumvent the growing costs of maintaining separate regional sales offices, Sprague classifies the experiment as a success.

"MIS has too big a backlog of user requests, to be responsive," Williams said. "These software application tools are a way of departments to get around MIS."

Herron at Datapoint explained, "Almost all vendors offer a family of horizontal software and application tools for spreadsheets, word processing, data base management systems and so on. The real incentive is to provide tools to custom produce such things as data base query programs and report generation. I'm not talking about programming in Cobol, just the ability to put some power directly into the hands of the departmental user."

Kolodziej is a senior writer at Computerworld Focus.

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Through The Plexiglass

Have you ever felt that everything was topsy-turvy when you found yourself dealing with end user concerns? If so, join Alice as she ventures through the plexiglass into the confusing world of office automation.

By Keith A. Brown

From her cubicle in the computer room, Alice could see the business world, from time to time, through the plexiglass window where users would come to submit their jobs and their complaints. Endless streams of them would file by the pigeonholes and carry away the listings, lest they clog up the holes and spill on to the floor.

At times Alice imagined what it might be like to pass through the plexiglass window and explore the business world on her own. Then one day the project leader assigned Alice a project — to implement office automation.

Suddenly the plexiglass had gotten all soft and gauzelike, and Alice's hand could pass right through it. She soon discovered that she could pass her whole self through; she did so at once and jumped lightly down into the business world.

She began looking about and noticed that what could be seen from the computer room was quite common and uninteresting, but all the rest was as different as possible. They don't keep this room as tidy as the other, Alice thought.

There was a listing lying on the table near Alice. She leafed through it to find some part that she could read, for it all seemed to be in some strange language.

She puzzled over this for some time until a bright thought struck her. "Why, it's a user listing, of course, and they read upside down from normal. So if I turn it around, the words will all go the right way again." This was the poem that Alice read:

Jabbercopy

Twas binary, and the flippin bits
Did twiddle and toggle in the shop
All vacant were the terminal pits,
And the virtual space did swap.

"Beware the abend code, my son!
The jaws that byte, the claws that cache!
Beware the JCL error, and shun
The ominous system crash!"

He took his object deck in hand;
Long the intermittent foe he fought —
So he rested by the Dasd bank
And stood awhile in thought.

As in structured analysis he stood,
The abend with eyes of flame
Came crashing through the sysout wood,
And dumped core as it came.

Zero, one! Zero, one! Over and over
He zapped the code, hack and hack!
He left it dead, and with its head
He went compiling back.

"And hast thou slain the abend code?
Come to my arms, my technocrat!
Oh joyous day in decimal mode!
You found where the bug was at!"

"It seems very pretty, but it is rather hard to understand!" (You see she didn't like to confess, even to herself, that she couldn't make it out at all.) "The words are familiar, but all have different meanings. However, somebody killed something; that's clear.

"But oh!" Alice thought, suddenly jumping up, "If I don't make haste I shall have to go back through the plexiglass window without seeing the rest of the office. Let's have a look in the garden first."

She went a long way, but wherever the road divided, two fingers pointed the same way — one marked "To Tweedledee's house" and the other "To the house of Tweedlepee." "I do believe," Alice said at last, "that they live in the same house. I wonder why I never thought of that before?" She wandered on talking to herself until, upon rounding a sharp corner, she came upon two fat little men. They were standing beneath a tree, each with an arm around the other's neck. Alice knew which was which in a moment because one of them had Dee embroidered on his collar and the other had Pee. "I suppose they both have Tweedle round at the back of the collar," she said to herself.

They stood so still she quite forgot they were alive, and she was just going round to check if they had Tweedle on back of their collars when she was startled by the voice of the one marked Pee. "I know what you're thinking," Tweedlepee cried, "but it isn't so, nohow."

"Contrariwise," Tweedledee said, "If it was so, it might be, and if it were so, it would be; but as it isn't, it ain't. That's logic."

"I came," Alice began, "to automate your office."

"Sounds horrid! You keep away from me!" Tweedlepee shrieked.

"Oh, but it truly is lovely," Alice explained. "It makes your work ever so much better and easier. It could increase your productivity 100%, so that one of you could fire the other!"

"Here now! None of that if you please, young lady!" Tweedledee said indignantly. "We've no productivity to improve here because we do not produce. Neither do we attrish."

"We shall see," Alice continued. "First we must do a study and discover that the project is justified."

"No, no, no!" Tweedlepee protested. "You have begun all wrong. When you sell a service, the customer justifies it if he so chooses."

Tweedledee added, "When you buy fish and chips, does the vendor have to make sure you are hungry? It is, after all, our money, paying for this drivel. You must tell us what it costs and of what use it is. If we decide it is worth the cost, we might buy it; otherwise, you may be on your way. So there!"

Alice was sure they were just being obstinate, but couldn't quite find the fault in their logic. If no rational reason could be found, she could always reference the standards. "The standards say we must do the cost benefit study," she stated sternly, "and find enough cost savings to cover the development."

"Balderdash!" Tweedlepee exclaimed. "Your standards don't bind me; they are your standards. You study the justification, but don't expect me to pay for it."

"And as for those cost savings," began Tweedledee, "That is ridiculous. Could not a project have any value of its own merit save displacing current costs? You could never justify anything new that way, only automation of the old. If we were in business to cut costs, we could just close up shop and be done with it. Anyway, it is time for our poetry recitation. "The Walrus and the Carpenter" is our longest. Care to hear it?"

The Walrus and the . . .

Here Alice ventured to interrupt him. "If it is very long," she said, "would you please first tell me which road . . ."

Tweedlepee smiled gently and began again.

The Walrus and the Carpenter
Took a walk way down the hall
They wept like anything to see
File cabinets along the wall
"If these were all on fiche," they said
"The stacks would be so small!"

"If seven clerks with seven cameras
Filmed till nineteen ninety-one
Do you suppose," the Walrus asked,
"That they could get it done?"
"I doubt it," said the Carpenter,
For schedule had he none.

The office phones were ringing loud
But not a message could one send
The papers, they swirled everywhere
Being blown from end to end

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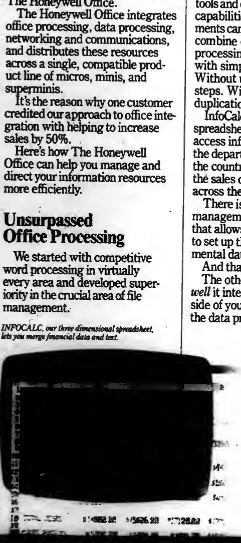

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• Integrated Spread Sheet	Yes	No	No
• Easy to Use Programming Tools	Yes	VS Only	No
• Query & Report Facility	Yes	VS Only	Limited
• Data Entry Facility	Yes	Limited	Yes
• User Application Interface	Yes	Limited	Yes
• X.25 Networking	Yes	VS Only	Yes
• SNA Networking	Yes	VS Only	Yes
• Exceeds ISO Networking Standards	Yes	No	No
• Electronic Mail—Peer to Peer	Yes	Limited	No

*Over 2000 installations.

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And this was odd because, you see,
There wasn't any wind.
"The time has come," the Walrus said,
"To speak of office stuff,
Of phones and paper and typewriters
But that is not enough,
For how can desks be like computers?
And must using them be tough?"
"Electronic mail," the Walrus said,
"Is what we chiefly need:
Calendaring and text besides
Are very good indeed."
"But if no one sends me mail," he asked
"Then what am I to read?"

When Tweedlepee had finished, Alice politely excused herself and proceeded to the garden. A table was set under a tree in front of the house, and the March Hare and the Hatter were having tea at it. A Dormouse sat between them, fast asleep, and the other two used it as a cushion, resting their elbows on it and talking over its head. The table was large, but all three were crowded together at one corner and shouted, "No room! No room!" as Alice approached. "There is plenty of room," Alice said indignantly as she sat down in a large armchair at the end of the table.

"Have some sangria," the March Hare said. Alice looked all round the table, but there was nothing on it but tea. "I don't see any sangria," Alice said.

"There isn't any," said the March Hare. "Then it wasn't very civil of you to offer it," said Alice.

"It wasn't very civil of you to sit down without being invited," said the March Hare.

"We must finish up this tea party so we can get on with the plan," said the Hatter.

"What plan might that be?" inquired Alice.

"Why the plan for the tea party, of course."

"But it makes no sense to plan a tea party when it is over," commented Alice.

"Oh, is that so, Miss Smarty? I suppose you plan things before they happen? Just what would you include in such a plan without knowing how the affair was conducted?"

"Well," thought Alice, "I suppose you would select the date and time, the names of the guests, where each would sit and how much tea must be brewed. Things of that sort, you see."

"Then you must plan very poorly," observed the Hatter. "How could you possibly get any of that right before the party? Can you tell where guests will sit, or even who will come? We certainly had no idea you would come until you did, but now that you are here we can properly put you in the plan."

"No, no," explained Alice, "You simply decide on the guests and guess at the amount of tea. You ask each if they will attend and discuss seating and other details. Then you publish the whole affair in a Requirements Document and force the guests to attend and do what the plan requires of them."

The Hatter countered, "But they might not come, and they may not know how thirsty they will be on the day of the party. The only way to get the plan right is to have the party first."

"Wake the Dormouse and ask him," said the March Hare. Then the Hatter and the March Hare both poured hot tea on the Dormouse, who roused and complained bitterly. "Tell us," said the March Hare, "whether one should plan a party before or after the party occurs."

The Dormouse said sleepily, "Why both, of course. You make your best guess at the plan, then you prepare the party according to the plan. When your guesses prove wrong, you adjust the plan. As the party progresses, you alternately plan and party. When it's over, your plan matches your party and vice versa."

"Idiot!" cried the Hatter and the March Hare. "You couldn't decide which answer, so you picked both," said the Hatter. "No fair," said the March Hare.

At this point, the three of them filled their teacups. Alice noticed each had his own teapot. How wasteful, Alice thought. "You know," she said, "you could all share the same pot and save a lot of tea as well. That would greatly improve your teapot utilization."

The three of them gazed at Alice in disbelief. "My dear confused little girl," condescended the Hatter, "At a tea party, the purpose of a guest is to drink tea, is it not? Teapot utilization is a meaningless concept. The purpose of teapots is to improve our productivity in drinking the tea. Teapots are here to improve our productivity; we are not here to improve the productivity of teapots! That is called 'optimizing the wrong resource.'"

Why does this make such perfectly good sense with teapots, but back home it never works with terminals in the computer room, she wondered. "This office automation project is going to be a lot more work than I thought," she said. "Perhaps it's just the beginning of a new and better way of doing business. But if it is not a project and it is new, perhaps all the things I learned in the computer room will need rethinking. I'm sure some of the ideas are still valid, but — oh dear, my head is beginning to ache from all of this. I had best get back to the computer room. There is much work to do."

Alice proceeded back through the plexiglass window. She returned to her cubicle, opened her standards manual to Page 1 — "Beginning a Project" — and read Step 1: Complete a cost-justification form. Was it only a dream after all?

Brown is a consultant in the firm of R.R. Blackmarr & Associates, Inc., management consultants located in Dallas, Texas.

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TAKE A LETTER....

STEVE HAEFELE

A developing technology on the office horizon is machines that recognize and transcribe speech. Read who the major players will be, when these new machines will appear and how they will change the office.

By John R. Vacca

Machines that transcribe speech already work in the laboratory — but don't fire the stenographers yet. How soon the machines will turn up in the office depends on the outcome of a nip-and-tuck race between the two leading technological contenders: IBM's Talkwriter (computer speech recognition system) and Kurzweil Applied Intelligence, Inc.'s Voicewriter (voice activated word processor).

IBM's experimental device was developed at IBM's Thomas J. Watson Research Center in Yorktown Heights, N.Y., and is one of the first talkwriters — machines that transform speech into text. It can understand more than 6,000 words — a small fraction of the more than 110,000 the average adult knows, but enough for composing routine business correspondence. IBM's experimental Talkwriter requires about $2 million of computing equipment — a large minicomputer and four auxiliary computers — to render an utterance into text.

The result of a 13-year development project estimated to have cost $16 million, IBM Talkwriter works in a radically different way from commercially available word recognizers. It operates entirely without templates; instead, it tests speech against two massive sets of statistics. One models the English language so that, given two words in a sentence, Talkwriter tries to predict which word in its 6,000-word vocabulary will come next.

Soon after IBM unveiled Talkwriter, Boston inventor Raymond Kurzweil, 36, of Kurzweil Applied Intellience, Waltham, Mass., called a press conference to present his machine — Voicewriter. He claims to have a loog lead on IBM and plans to start production of a voicewriter with a 16,000-word vocabulary early next year. At an initial price of nearly $30,000, it is designed to be shared by several users.

Like IBM's system, Kurzweil's machine is designed to transcribe rapid dictation instantly, but requires users to pause briefly between words. It too must be trained to understand a speaker's pronunciation — a process Kurzweil says will take two or three hours in the finished product.

Talkwriters/voicewriters promise to make computers accessible to tens of millions of people who can't type and to speed the journey to paper of ideas now slowed by keyboards, pens and stenographers. Although it's too early to reliably forecast the potential, industry participants think the market for talkwriter/voicewriter machines could grow as quickly as the market for word processors (now over $3 billion a year).

Such machines also represent an important step toward computers that can converse with humans, along the stuff of science fiction. In fact, an episode of "Star Trek" called "Assignment: Earth" hinged on such a machine. Imagine speaking into a device that could translate your verbal pearls of wisdom, memos and letters into neatly typed text. The voice/talk-activated typewriter has been sought after since the mid-1940s. More properly termed a voice/talk-activated word processor, this powerful machine would rival even Mr. Spock's "Vulcan mind link."

IBM's Talkwriter: IBM scientists have actually created and demonstrated a prototype speech recognition system (Talkwriter) that can correctly recognize and transcribe speech from a large vocabulary almost as fast as the words are spoken. According to Tom Murphy, communications specialist at the Thomas J. Watson Research Center, "Spoken communication with computers has long been an industry goal, and some inroads have now been made: Limited recognition of human speech has even found its way into a few consumer and industrial products." It allows human voice input to create office documents such as letters and memos. It can recognize sentences composed from a 6,000-word business correspondence vocabulary and correctly identifies more than 96% of the words in these sentences.

In a demonstration with outsiders, IBM found the system performed better than they thought it would. Meant to understand only speakers who had enrolled their voices in its memory by reading it a 20-minute training text, the system was able to decipher the words of a stranger.

Based on its large vocabulary, high accuracy and real-time recognition of the spoken words, IBM scientists believe this is the most advanced speech recognition system yet developed. Designed to adapt to individuals, the system trains itself to recognize a person's voice by listening to the user read a brief standard text. The system requires a short pause between words during both training and dictation. A small microphone on the user's desk picks up the speech.

Once the system is trained, words, phrases and sentences appear on a workstation screen as the individual speaks.

The resulting letter or memo may be edited or amended by voice or keyboard.

The recognition technique is statistical. It functions by determining the degree of similarity between the speech and the words in its vocabulary as well as the probability that they would be used with other words in the sentence. Both pronunciation and context are considered so the system can distinguish between *to, do* and *through* because they are pronounced differently and between *to, too* and *two*, based on the surrounding words.

Words not stored in the vocabulary can be used in documents by spelling them out, and new words that will be frequently employed can be verbally added.

IBM's speech recognition system uses an innovative and unique statistical method to transform human speech into text.

"Our recognizer statistically models the essential speech processes involved," said Frederick Jelinek, who heads the IBM speech recognition group. "That includes the way the speaker pronounces words, puts words together to form sentences and details of the speaker's personal vocal characteristics.

"The system is not based on rules, nor does it attempt to imitate the way people create or recognize speech. It computes the probability that a given word will appear in a particular context based on an analysis of about 26 million words of office correspondence." Jelinek said.

Recognition begins by extracting a set of 20 measurements from the speech every one-hundredth of a second. The system compares each of these sets of measurements with 200 patterns (automatically tailored to the individual's voice during the 20-minute training session) and makes the appropriate matches. This labels the sound segments so they can be identified.

Next, the system examines the sound labels in this context (that is, their apparent relationship to each other at that instant). On this basis, it chooses several candidate words from its vocabulary.

As additional sounds are uttered, new word candidates are created and initial candidates are reevaluated in light of this new data. The number of candidates is thus narrowed until the most probable word sequence is selected.

If the spoken word is in the vocabulary, the system correctly chooses more than 95% of the time. If the word spoken is not in the vocabulary, it chooses one that is; it can be changed later with the system's editing features. Words not in the vocabulary can be added to the vocabulary while dictating.

The speech recognition computations are done by an IBM 4341 working with three Floating Point Systems array processors. An IBM Personal Computer handles communications, and other special-purpose hardware is used for document formatting.

Kurzweil Applied Intelligence's Voicewriter: According to Kurzweil, the Voicewriter project is already well past its essential software development breakpoint. "Speech Systems is ahead of schedule in development," he said. "The expert software modules have already been demonstrated in the lab. The custom VLSI chips have been designed. And we are currently working on the key hardware architecture."

At a recent demonstration, Kurzweil's guests were warned that the prototype being shown would identify words, not instantaneously as the final product is supposed to, but at the rate of one word every 2.5 minutes. They watched through the window of an acoustic isolation chamber as an engineer read a sentence that one of them had proposed.

Just as in IBM's demonstration, a nearby monitor gave an intriguing picture of what was going on inside Voicewriter. Voicewriter began by making a series of passes over sounds it had to decipher. The first pass established a list of word candidates that each subsequent pass refined. The word *controversy*, for example, showed up accompanied by *conspiracy, bankruptcy, embassy* and *New Jersey*, all of which Voicewriter thought less likely but still possible. At the end of this procedure, which lent drama to the two-minute wait between words, Voicewriter displayed its final choice on the main screen. It picked the right word every time. The sentence read, "Along with the increased attention has come increased controversy as to what constitutes an intelligent machine."

Market analysts estimate a $6 billion market for voicewriters/talkwriters by 1990. A substantial percentage of that market — transcribing natural human speech — will be supplied by IBM and Kurzweil.

Unlike IBM's great statistical engine that subjects words to only two tests, the Kurzweil Voicewriter is a big bag of speech recognition tricks. The system applies more than a half-dozen programs to each word, comparing it in various ways with stored patterns and analyzing its role in the sentence being spoken. Some programs make predictions about the word even before it is said; others work on it during or after pronunciation. Kurzweil calls these testing programs "experts"; their work is coordinated by a master program called "expert manager," which weighs their results and resolves disputes. In the case of choosing between *tore* and *door*, for example, the expert manager would favor advice from the sentence structure program and ignore an acoustic program because short words are hard to differentiate by sound alone.

With so many complex programs operating simultaneously, Kurzweil's scheme requires more computation than IBM's. Voicewriter would be prohibitively expensive if it had to depend on ordinary computers. Kurzweil avoids this problem with arrays of custom-designed special-purpose chips. No one knows for sure what will happen when Kurzweil tries to speed the system up from two minutes per word to the 150 words per minute needed to take dictation.

The major software subsystems of Voicewriter include a language processor that applies grammatical and syntactical rules and the characteristic patterns of a speaker's voice to the task of inferring what a spoken word will be. Using that process, humans can narrow the possibilities down to around 60 words. Voicewriter can reduce the number of possibilities to around 600 out of a vocabulary of 11,000. Once the choice of possibilities has been narrowed down, the second major subsystem applies acoustical patterns to the 600 to determine precisely which one is being spoken.

The acoustical subsystem has been the most difficult to create. English, a rich mongrel language bred of Trentons, Celts, Romans, Norman French and a dozen other peoples, has 11,000 syllables; compare that with a tidier spoken language like Japanese with only 130. (The Japanese, however, may have a more compelling need for a voicewriter system because their typists have to contend with some 3,300 characters.) Digitized wave forms of speech signals, changes in pitch, phonetic information, syllables and words — information at all these levels has to go into the recognition algorithms.

Kurzweil cited one simple example of the difficulties encountered in developing the acoustical subsystem: "The vocal tract goes through certain transformations to pronounce a vowel. Perhaps the speaker doesn't pronounce the vowel, but goes directly into pronouncing the following plosive. Voicewriter has to be able to deduce the presence of the vowel from the context of the voice preparation to pronounce it and the following plosive. Syntactical and grammatical constraints also have to be programmed into the system to resolve ambiguities."

Therefore, among the 25-member team of computer scientists, electrical engineers and human factors experts — speech scientists and linguists are especially important.

Kurzweil and his research team at Kurzweil Speech Systems are exceptionally reticent to discuss the technical details of their work — one of the reasons, no doubt, Kurzweil has managed to protect the exclusivity of his inventions.

Market analysts estimate a $6 billion market for voicewriters/talkwriters by 1990. A substantial percentage of that market — transcribing natural human speech — will be supplied by IBM and Kurzweil.

The future of IBM's talkwriter system will be assured through the continuous work of their speech recognition research team. Over the past 13 years, this team has performed a number of such experiments to determine what is technologically feasible in speech recognition. In doing so, these scientists are supplying answers to the first question of technology: What is possible? Their answers are creating a body of knowledge that will contribute to answering technology's further questions: How and when might such technology be best applied outside the laboratory?

The IBM team's future research goals in speech recognition include enlarging the vocabulary, increasing the system's accuracy, shortening the training period, making the system more impervious to extraneous noises and enabling the system to recognize continuous speech. "Our next objective is to enlarge the vocabulary and make the system even easier to use," Jelinek said. "Ultimately, we believe such a system might be able to recognize continuous speech without pauses. Our results so far convince us that this is a reasonable goal."

On the other hand, from a technical standpoint there is little doubt that Kurzweil's (IBM's counterpart) promise to produce a working voicewriter system by early 1986 has, for the most part, already been fulfilled. Whether or not the work of configuring a system within a practical cost range will be done by 1986 is not as clear. Kurzweil said the voicewriter system makes use of "large standard hardware subsystems that will help bring down the price." In addition, Kurzweil has also brought production, quality control and marketing experts into his company to supply manufacturing and sales strength.

According to Kurzweil, some 80% of all today's business text is created either by hand or by hunt-and-peck typing. The market for a workable voicewriter system is therefore enormous in terms of text production and editing alone. Data base retrieval, potentially a much larger applications area, is second. "That's the whole thrust of the fifth-generation computer project sponsored by Japan's Ministry of International Trade and Industry," Kurzweil said, "providing ease of access to computer-based information and computer tools to nontechnical personnel. Natural language processing and the voicewriter are two of the four pillars of the project along with supercomputers and artificial intelligence."

Kurzweil is already working on follow-on products to the first Voicewriter that will be announced in early 1986. One of them, he hopes, will be a voicewriter-based system to enable deaf people to use the telephone with complete freedom and flexibility. Anyone who knows anything about Kurzweil and his impossible machines will have very little doubt in mind that he'll not do it.

Therefore, even if IBM's or Kurzweil's system works, it will take a few years before such speech recognition systems can make communicating with a computer as easy as talking to a person. However, researchers are growing confident that they can solve whatever problems crop up — even though it could take 15 more years.

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Vacca is a free-lance contract writer and consultant in information management and security, based in Topeka, Kansas.

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Products

WESTBORO, Mass. — **Data General Corp.** recently announced the Dasher/One workstation, CEOwrite and a letter-quality printer.

Dasher/One is the first in a series of intelligent workstations that extends the functionality of its Comprehensive Electronic Office (CEO) to the MS-DOS environment, the vendor said. Dasher/One allows the user to implement specific business applications that run on the IBM Personal Computer, is fully compatible with DG's Eclipse/MV processors and, when used within a departmental cluster, enables users to share peripherals, applications and information, according to the vendor.

CEOwrite is a word processing package that runs on the Dasher/One workstation, the DG/One lapsize portable computer and the IBM PC. In addition, it is fully integrated with DG's CEO via the CEO Connection, a software link between Dasher/One, DG/One, IBM PC and Eclipse MV/Family computers. Rounding out this product line is a letter-quality printer that produces output at 20 char/sec.

The prices for this family of products are $2,100 for the 256K-byte memory, single diskette Dasher/One workstation, $395 for the CEOwrite software and $650 for the Model 4467 printer. For more information, Data General Corp., Information Systems Division, 4400 Computer Drive, Westboro, Mass. 01581.

LOWELL, Mass. — **Wang Laboratories, Inc.** Information Services Corp. (Wisc) has announced a text and data messaging service that enables companies with mobile employees or multiple locations to access information, according to the vendor. The new service, called Text and Data Messaging (TDM), includes a portable terminal and is available immediately for a basic monthly fee of $90 plus 35 cents/min of measured long-distance communications usage when access is gained through Wisc-provided Wats numbers.

The portable word processing, data entry, printing and communicating terminal, WP 600, includes the Wang Model 7000 modem, a snap-on Bell 103-compatible communications device that plugs into any standard RJ-11 phone jack. WP 600 weighs 6.4lb, has a 44-key typewriter keyboard, a 24-char. display and cursor controls.

While WP 600 and the Wang Model 7000 modem are included in the Wisc service, they can also be purchased directly from Wang for $549 ($525 for WP 600, $75 for the modem). Write to Wang Laboratories, Inc., 1 Industrial Ave., Lowell, Mass. 01851.

MERRIMACK, N.H. — External Document Exchange (EDE) with Distributed Office Support System (Disoss), a software product that exchanges revisable and final form documents stored in an IBM host library into revisable form WPS-Plus and DECdx VAX/VMS documents, was recently announced by **Digital Equipment Corp.** According to DEC, EDE with Disoss provides advanced Disoss interface capabilities conforming to Document Interchange Architecture/Document Content Architecture utilizing Logical Unit 6.2 (IBM's peer-to-peer communication capability).

The product allows users to search, retrieve, file, edit or delete documents residing in an IBM host document library. By integrating the IBM Displaywriter, 5520 Administrative System and 8100/Distributed Office Support Facility (DOSF) with DEC office systems, WPS-Plus and DECdx can access and edit documents created on IBM systems. In turn, documents created on DEC systems can be filed into an IBM Disoss data base for later access.

EDE with Disoss software is priced between $3,000 and $4,500 depending on the VAX system configuration and is available immediately.

More information is available from the vendor, Digital Equipment Corp., Maynard, Mass. 01754.

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Products

KING OF PRUSSIA, Pa. — Previously incompatible office systems from Wang Laboratories, Inc.; NBI, Inc.; Xerox Corp.; and other vendors can reportedly exchange notes, final form documents and revisable form documents with users of IBM Professional Office Systems (Profs) through an interface available from **Soft-Switch, Inc.** The Soft-Switch interface allows office systems to send and receive notes from Profs users without the users needing to know what office system the recipient uses or where it is located in the network.

The interface supports the following IBM systems: IBM Personal Computer, IBM Final Form Print Image, IBM DCF (Script), IBM Displaywriter, IBM Displaywrite 2 and 3, IBM 5520; IBM OS/6, and the 6640 and 6670 laser printers. It also supports the NBI Oasys 8 and 64, NBI 3000 and 4000, Wang OIS and VS, Xerox 850 and 860 and the Multimate system for the IBM PC.

The Soft-Switch product line is priced per module with a typical introductory system licensed for $49,000. The Profs interface is available immediately for $20,000 ($10,000 if the customer already has the required Soft-Switch final form generic print translator).

For more information, contact Soft-Switch, Inc. at 200 N. Warner Road, King of Prussia, Pa. 19406.

DAYTON, Ohio — **Fox Research, Inc.** has introduced the Fox 10-Net RS-232 gateway and 10-Net RM Cobol Runtime, two networking products.

The RS-232 gateway allows remote IBM Personal Computers to dial-in and become part of the company's 10-net local-area network, according to the firm. The company added that the software works through a telephone and an asynchronous modem to allow remote IBM PCs and IBM compatibles to have the functionality of local-area network nodes.

RM Cobol Runtime allows Ryan/McFarland (RM) Cobol users to share files and lock records of common files with full concurrency control while operating on the Fox 10-Net local-area network, the company said.

The RS-232 gateway software is priced at $89.95 for the single IBM PC or IBM compatible link and $595 for the multiple local-area network version. RM Cobol Runtime, including software and documentation, is priced at $495.

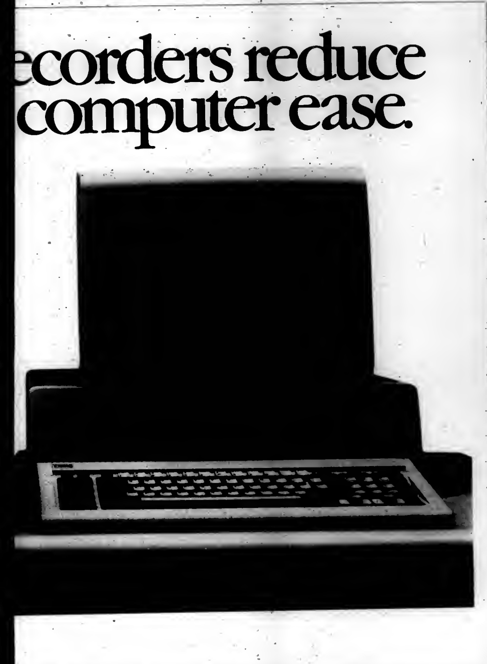
For more information write to Fox Research, Inc. at 7005 Corporate Way, Dayton, Ohio 45459.

DANBURY, Conn. — **VM Personal Computing, Inc.** has released Relay Gold, its communications software package for the IBM Personal Computer, IBM compatibles, Data General Corp. DG/One personal computer and Wang Laboratories, Inc. personal computer.

Designed to link microcomputers to other micros as well as minicomputers and mainframes, the company said Relay Gold's features include multitasking, a new generation script language, full menu or command-driven operation, screen rollback, a learning mode and a tutorial disk.

The company added that binary, text and data files can be uploaded or downloaded to and from IBM mainframes using Relay/3270, VM Personal Computing's mainframe package. Relay Gold is priced at $225, Relay/3270 at $9,500.

Further information is available from VM Personal Computing, Inc., 6 Germantown Road, Danbury, Conn. 06810.



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Calendar

October 21-23, Boston — **Hammer Forum '85.** Contact: Hammer Forum, 5 Cambridge Center, Cambridge, Mass. 02142.

October 21-23, Washington, D.C. — **Controlling Software Projects: Management, Measurement and Estimate.** Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

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